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MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

MAY AND JUNE, 1872.

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MONTHLY REPORT.

DEPARTMENT OF AGRICULTURE,
Statistical Division, June 22, 1872.

SIR: I respectfully present, for publication, a report of the condition of crops for the month of June, with collections of statistics and records of the condition of agriculture, from home and foreign sources; articles upon Northern farming and Southern planting, the deterioration of cotton and sugar-cane, and the epizootic diseases of swine; and notes of current work of the entomologist, chemist, and botanist, a record of scientific discovery in the direction of rural arts, and miscellaneous facts from original sources.

J. R. DODGE,
Statistician.

Hon. FREDERICK WATTS,
Commissioner.

CONDITION OF THE CROPS IN JUNE.

WHEAT.

The returns for June have been carefully examined, percentages of area and condition have been tabulated, and averages calculated with reference to the comparative wheat area of each county. This compound method—and only true one of obtaining a State average—involves an immense amount of labor, which cannot be done in a day; yet the result is a reliable and satisfactory expression of the deliberate views of the county statistical boards, and may be received as the only complete and approximately accurate review of the wheat prospects of the country in the first week of June, 1872.

The following tabular statement of the general character of the returns from nine hundred and three counties, including a large proportion of the wheat area of the country, shows that 48 per cent. are unfavorable, 22 present an average condition, and 30 per cent. are above average.

	Average.	Above average.	Below average.	Total.
	Counties.	*Counties.*	*Counties.*	
Maine	6	3	2	11
New Hampshire	6	.....	1	7
Vermont	5	4	1	10
Massachusetts	4	.....	1	5
Connecticut	3	.....	1	4
New York	1	2	30	33
New Jersey	1	.....	11	12
Pennsylvania	1	.....	37	38
Delaware	1	.....	2	3
Maryland	.....	.....	13	13

	Average.	Above average.	Below average.	Total.
	Counties.	*Counties.*	*Counties.*	
Virginia	11	5	36	52
North Carolina	16	20	12	48
South Carolina	9	2	3	14
Georgia	19	27	11	57
Alabama	4	15	2	21
Mississippi	6	3	.....	9
Texas	3	7	.....	10
Arkansas	3	8	2	13
Tennessee	7	26	4	37
West Virginia	3	4	21	28
Kentucky	14	18	6	38
Ohio	2	2	48	52
Michigan	5	5	25	35
Indiana	8	10	38	56
Illinois	10	16	26	52
Wisconsin	10	16	4	30
Minnesota	9	11	1	21
Iowa	9	37	4	50
Missouri	4	8	55	67
Kansas	3	1	28	32
Nebraska	1	11	2	14
Oregon	8	1	2	11
California	5	8	6	19
Total	199	270	434	903

A calculation of the percentage of area as given in the general tables which follow this crop report makes the depreciation in the total area 2 per cent. The wheat crop of 1871 was estimated at 130,000,000 bushels, at the close of the harvest, with an average yield of 11½ bushels per acre. If 12 bushels be taken as a fair average, a yield of 11½ would be a depreciation of $4\frac{1}{6}$ per cent. The October returns of estimated product made the total depreciation nearly 7 per cent. The total average of condition in the June returns of the present year is 94, which would indicate a product (prospects continuing unchanged till harvest) of fully 220,000,000 bushels. This would be 67,000,000 bushels less than the unprecedented crop of 1869.

An increase of area in spring-wheat is reported in ten counties in Maine, and a decrease in one (Piscataquis) of 5 per cent. Somerset gives 15 per cent. increase, and Aroostook 10, the average for all the counties reported being 8 per cent. Very little winter-wheat is grown, but there appears to be an increase in the area. Only Lincoln and Sagadahoc report low condition, and the general average is 1 per cent. above.

Only two counties in New Hampshire—Grafton and Strafford—give diminished acreage. Sullivan and Merrimack show an increase. The acreage is equal to the area of the last crop. All except Strafford report 100 for condition, making the general average 99.

Ten counties in Vermont make returns of spring-wheat, seven reporting the same area as last year, Orleans 105, Chittenden 110, and Orange 115. In condition only Bennington is below average, Addison and Orange 120, and the average of all 106.

In Massachusetts a diminution of 4 per cent. of its very small area appears. In Franklin County, which produces nearly half of the winter-wheat of the State, and very little spring-wheat, the area of the former has been reduced 5 per cent., while its condition is 100, or average. Worcester, which grows more than half of the spring-wheat of the State,

makes an average, both in area and condition, while the general average of the State, both for winter and spring, is 98.

The returns from Connecticut average 95 per cent. for area, and 88 for condition. Returns from several counties do not include wheat.

Of thirty-three counties of New York reporting winter-wheat, (representing six-sevenths of the crop,) only Warren and Westchester, which grow very little wheat, return condition higher than 100, and Putnam 100. The general average is for winter 68, and 91 for spring; representing a deficiency in the wheat-crop of New York of about 28 per cent. Five counties—Monroe, Niagara, Livingston, Ontario, and Genesee—which produced more than four millions of bushels in 1859—average this season but 64 in condition. The total area of winter wheat is 98 per cent., only Wayne, Niagara, Steuben, Dutchess, Schuyler, Schenectady, and Delaware, making returns below 100, while Warren, Wyoming, Broome, Yates, Monroe, Oneida, Erie, and Jefferson make returns above 100. The wheat prospects indicated by the April returns, which were not very cheering, have been impaired by drought.

Twelve counties in New Jersey, which represent four-fifths of the total product, average 98 per cent. for area and 70 for condition. Only Essex, which is unimportant as a wheat county, returns average condition, while Hunterdon, the first in wheat production, returns 25.

A reduction of one-tenth of the wheat area of last year is indicated in Pennsylvania, and a condition of 30 per cent. below an average is presented. The reports represent thirty-eight counties, of which Clearfield alone returns 100. Had the season been propitious since the opening of spring, the losses by winter-killing would have been by no means irreparable—scarcely even formidable. The York correspondent declares the prospect the worst one for thirty-seven years. Drought, cool winds, and the fly are among the evils added to winter-killing.

We have returns from thirteen counties in Maryland, which together produced 86 per cent. of the wheat reported by the last census. No return gives an average condition, the highest being 85 for Calvert. Frederick, which usually produces one-fifth of the crop of the State, is credited with 70; Montgomery sends the same figure; and other counties make still worse returns, as 60 for Howard and Queen Anne; 50 for Baltimore and Talbot; 30 for Cecil; 25 for Carroll, Washington, and Harford; and 20 for Kent.

Delaware has been afflicted with drought, reducing condition to 70, while the area in comparison with that of last year is 96.

Fifty-two counties of Virginia indicate a loss of 2 per cent. in area, and a depreciation below an average of 15 per cent.; only five counties indicate condition above 100; thirty-six below, and eleven 100. Those standing highest are Gloucester, Montgomery, Giles, Scott, and Henry. Loudoun, which should yield half a million bushels, is placed at 60, and Augusta, which stands next in production, is put at 80.

South of Virginia, reports are more favorable. North Carolina gives an average of 101, both for area and condition. Of forty-eight counties reporting, only twelve place condition below 100. The superior appearance of drilled wheat is noted.

In South Carolina, area is represented by 96, and condition by 97.

Fifty-seven counties in Georgia make wheat returns. Very little complaint of rust or insects is made, and the weather has been quite favorable. The area is averaged at 98, and condition rises to 105. Only eleven returns of low condition are made.

In Alabama few counties produce wheat except to a very limited extent. Twenty-one make reports which are quite promising. Area 105-condition 115.

Only nine returns of wheat come from Mississippi. These indicate a decrease of 5 per cent. in area, and place condition at 104.

From Texas only ten counties make returns. These indicate an increase of 15 per cent. in area, and place the average condition high, at 117.

Wheat is in fine condition in Arkansas, (110,) though there is always quite too small an area, and that of the present year has declined 10 per cent. from last year.

Thirty-seven counties in Tennessee make returns of wheat, only four of which present condition below 100. It is noted that better tillage is beginning to prevail, and that a good harvest is assured from lands properly tilled. The reported area is 3 per cent. greater than that of last year, and condition high, averaging 117.

In West Virginia there is no decrease in the wheat area, but its condition is not promising, being represented by 85; Jefferson, a county famous for flourishing wheat-fields, by 62. Three-fourths of the twenty-eight counties reported make low returns of condition. There was some injury by winter-killing, and more by drought in May.

A diminution in area of 8 per cent. is apparent in Kentucky, but the crop is in superior condition, averaging 108, only six counties standing below 100 of the thirty-eight reporting. Seven counties, representing one-fifth of the crop of the State—Christian, Hardin, Jefferson, Mercer, Shelby, Spencer, and Warren—average 115 in condition.

Returns from fifty-three counties in Ohio indicate a reduction of 12 per cent. in the area, and 22 in condition. Ten counties, Butler, Crawford, Darke, Fairfield, Greene, Logan, Miami, Montgomery, Seneca, and Stark, representing one-fourth of the usual product of the State, average a depreciation of 20 per cent. in condition. Sciota and Butler are placed at 110, and Fairfield and Huron stand at 100, Trumbull and Delaware reporting 95; Hamilton, Geauga, and Seneca, 90; Holmes and Mahoning 85, and all others falling still lower. The reported causes of damage are freezing, drought, the Hessian fly, and poor tillage.

The prospect is almost equally gloomy in Michigan. A reduction of 8 per cent. in area is reported, and the average condition is placed at 75. Thirty-five counties are represented, among which are Oakland, Washtenaw, Jackson, Kalamazoo, Cass, Lenawee, Livingston, Barry, and Genesee, which produce nearly as much wheat as all the remaining counties of the State. The counties named indicate a reduction of 8 per cent. in area, and a condition 30 per cent. below average. Drilled wheat is more promising than that sown broadcast.

In Indiana the area is represented by 94, condition by 85. There is great variety in the returns; among those counties which have produced half a million bushels each, Carroll stands at 100, Shelby 95, Park and St. Joseph 80, Johnson 75, Kosciusko 60, Randolph 50. Fifty-six counties are reported, of which thirty-eight are below an average in condition, and but ten above. In Kosciusko frost as late as May 3 injured the crop. In some places the fly is reported, in others the chinch-bug, while drought has been general, though of unequal duration, and at some places it still continues. The superior advantage of drilling and good tillage is repeatedly stated.

In Illinois the Hessian-fly is found in many places, and the chinch-bug is troublesome. The area in winter wheat is undiminished,

but condition is 20 per cent. below average. The following counties, which produced nearly eight million bushels in 1869, return condition, Saint Clair and Monroe 110; Madison 100; Clinton, Randolph, and Perry 90; Lawrence 75; Macoupin and Montgomery 50; Sangamon 25. The remainder of the forty-six reports of winter wheat present a similar variation. In spring wheat there is a reduction of one-fourth in area, while its condition is a full average. Among the counties producing spring wheat largely the following report very favorably: Rock Island and Carroll 110; Ogle and Boone 105; Lee 120; Bureau 100. Of twenty-seven reporting spring wheat only four are placed below 100, viz: Champaign, Menard, Massac, and Putnam.

The wheat prospect is good in Wisconsin: area of spring wheat, 98; condition, 104. Thirty counties report spring wheat, of which Brown, Iowa, and Washington only fall below average. The following counties, representing one-third of the crop of the State, average 105, viz: Walworth, 120; Green Lake, Grant, and Jefferson, 110; Saint Croix, Fond du Lac, (these two having grown 1,500,000 bushels each,) 105; Washington, 95; Iowa, 90. Very little winter wheat is grown.

The prospect is cheering in Minnesota. Winter wheat is low in area and condition, but there is never fall-sown wheat enough for mention as affecting the general crop. The area of spring wheat is 101, of winter 76, but the deficiency of the latter does not amount to a quarter of one per cent. of the total average. In condition the average for spring wheat is 106. Returns are received from twenty-one counties, yet five of the number produce nearly half of the wheat of the State, viz: Olmstead, 100; Fillmore, 125; Dakota, 120; Goodhue, 100; Wabashaw, 120.

Forty-nine counties in Iowa make returns of spring wheat, and eighteen of winter. The area of the former is 106; of the latter 102; but there are 30 acres of spring wheat to one of winter. The condition of winter is averaged at 80; of spring at 111. Only three returns (from Appanoose, Henry, and Carroll) place spring wheat below average: eight return average; and thirty-eight above average. The following eleven counties, which produced ten millions bushels in 1869, average an increased area of 4 per cent., and are placed at 12 per cent. above average condition, viz: Black Hawk, Clayton, Tama, Winneshiek, Clinton, Jasper, Linn, Alamakee, Cedar, Delaware, and Marshall.

Missouri comes nearer a failure than any other Western State. The area of winter-wheat appears to be reduced 8 per cent., and condition is 42 per cent. below average. Spring-wheat is doing comparatively well, but its proportion to winter is only as 1 to 13. There are reports of winter-wheat from sixty-seven counties, and only Saint Genevieve, Crawford, McDonald, Reynolds, Wayne, Carter, and Perry stand above average. "A failure" is reported from Holt and Moniteau. The late-sown winter-wheat was severely injured by freezing, and the spring has been unfavorable. Chinch-bugs in vast numbers have attacked some localities. Again and repeatedly comes the statement that drilled wheat is not winter-killed in dry soil, and that that sown broadcast is very poor, and in some cases has been plowed up. And yet some farmers and agricultural writers have not learned of the benefit of drilling and draining as a protection to wheat.

In Kansas the area is nearly equally divided between winter and spring wheat, with a slight preponderance of the latter. The result of the present crop will tend to make the disparity wider. The area of winter-wheat averages 62, of spring 140; condition of winter 46; of spring 108. There are thirty returns of the former, and twenty-nine of the latter. Only Sedgwick, Shawnee, Howard, and Linn, of the spring-

wheat counties, report low condition; only Crawford, Jefferson, and Washington come up to an average in winter-wheat.

The prospect in Nebraska is quite promising. Though winter-wheat is in very poor condition, it is grown upon a small area, and spring-wheat is reported at 14 per cent above an average, with an increase of 13 per cent. in acreage. Cass, Burt, and Lancaster, together producing half a million bushels, average 112 in condition. There is no report of low condition, except in winter-wheat.

Our returns from California are not full, though representing about half of the wheat area of the State. A large increase of area is shown, and the promise of a large yield is general. The returns of correspondents, together with information from outside sources, lead to the belief that an increase of at least ten to twelve million bushels will be made.

An increased area is also apparent in Oregon, and the prospect is good for a nearly average crop.

The following very brief extracts from remarks accompanying the statistical returns will serve, not to give a complete idea of the wheat prospect, which is more accurately presented in the tables and the summary preceding, but to illustrate the local peculiarities of the crop:

MAINE.—*York:* Wheat looks finely where it was not covered with snow and ice. *Cumberland:* Spring-wheat looks well.

VERMONT.—*Orange:* Winter crop fine. *Grand Isle:* Winter-killed. *Orleans:* Small but looks well.

NEW YORK.—*Tioga*: Materially injured by drought. *Jefferson:* Half winter-killed. *Livingstone:* Injured by April drought. *Yates:* Poorest prospect known. *Genesee:* Injured by extreme cold of winter; good rain may improve it, but it will be below average. *Chatauqua:* Poorest ever known; growth small; no heads yet in sight. *Kings:* What is left of the crop looks well; shortened by extreme winter cold. *Wyoming:* Shortened by drought. *Otsego:* Badly winter-killed. *Ontario:* Poor. *Erie:* Stands well, but is small. *Seneca:* Almost a failure through drought.

NEW JERSEY.—*Warren:* Will not yield over a half crop. *Sussex:* Looks badly. *Mercer:* But little more than a half crop, on account of the cold dry winter and spring; fly in some fields.

PENNSYLVANIA.—*Armstrong:* Spring drought gave but little chance to recover from the winter freeze. *Berks:* Winter and spring unpropitious. A few fields have been plowed up for corn. *Greene:* Looks badly. *Lycoming:* Badly-winter killed, and still further injured by late spring. *Susquehanna:* Badly winter-killed. *Lancaster:* Not over 8 bushels average per acre; the fly threatens what the hard winter has left. *Montgomery:* Badly winter-killed; many fields plowed for corn. *York:* Crop shorter than for thirty-seven years. *Fulton:* Fultz wheat better than any other variety. *Centre:* Drought has made many fields bare. *Huntingdon:* Injured by hard winter and dry spring. *Chester:* Injured by cold winter and spring, and also by the fly. *Beaver:* Shortened by drought. *Indiana:* Northwest winds blew the dry earth from the roots of the wheat. *Mifflin:* The crop a failure; largely winter-killed. *Tioga:* Injured severely by fall drought and winter freeze. *Northumberland:* Prospects poor; Fultz wheat better than the common. *Union:* Crops tolerable; greatly improved by late rains. *Lawrence:* Half crop. *Fayette:* Badly injured by March winds.

DELAWARE.—*New Castle:* Severely affected by drought.

MARYLAND.—*Carroll:* Severe winter and spring with the fly, have reduced the crop one fourth. *Howard:* Acreage decreasing; farmers say the crop does not pay. *Baltimore:* Fly and other insects troublesome. *Queen Anne:* Not over a half crop possible; stands thinly on the ground; straw short; without speedy rain the heads will not be filled out. *Montgomery:* Fly at work; joint worm expected to follow. *Cecil:* A few fields tolerable, but the general condition never was worse; some fields plowed up. *Kent:* Dried up. *Washington:* Most general failure since 1836: many fields will not be cut. *Charles:* Recent rains have raised the wheat crop to a fair promise.

VIRGINIA—*Culpeper:* Early drilled winter wheat 90 per cent; early broadcast 50; later wheat suffered severely from freezing, broadcast more than drilled. Fultz wheat from the Department 105; Touzelle, 115; Ushak, 112. *Spottsylvania:* Heads low but well filled. *Henrico:* Crop still fine in spite of serious injuries. *Botetourt:* Injured by drought, fly, and joint worm. *Stafford:* Winter crop badly injured by cold and drought. *Middlesex:* Heads low, but prospects fair for a good crop; Fultz wheat making a splendid crop; better than any other. *Charlotte:* Short, but excellent; no rust. *Craig:* Below average. *Lancaster:* Cold and drought will prevent rust. *Giles:* Above average promise. *Surrey:* Acreage decreased; crop thin and small.

Richmond: Winter-killed and cut down by drought; Fultz wheat vigorous. *Fluvanna:* Wheat backward, but filling well; Fultz wheat especially promising; tillering and heading finely. *King and Queen:* In bad condition; fears expressed that the crop will be abandoned. *Pulaski:* Stood the winter well, but the dry, cool spring and the fly have injured it. *Orange:* Recent rains have been of great benefit to wheat early sown on good land, but most of the fields are very poor. *Highland:* Injured by winter freeze and spring drought. *Madison:* Wheat improved by late rains, but cannot make a full crop. *Rockingham:* Not even a half crop. *Rappahannock:* Heads short and low. *New Kent:* Looks remarkably well. *Prince George:* Acreage reduced; drought has kept off rust from early sown fields. *Bath:* Looks badly; Fultz wheat much better. *Amherst:* A fine prospect; seriously injured by drought. *Mecklenburgh:* Badly winter-killed. *Nelson:* Crop short. *Augusta:* Worse than for many years. *Clarke:* Crops are promising; much better on the iron-ore lands west of the Shenandoah. *Prince William:* Suffering severely for rain. *King George:* Greatly improved by recent rains.

North Carolina.—*Randolph:* Prospect fair. *Mecklenburgh:* Better than for many years; drilled Fultz wheat very promising. *Chowan:* Very ordinary. *Camden:* Wheat culture almost broken up by rust, scarce fifty acres sown where once there were many thousands. *Rowan:* Heads small and not well filled; straw short; drought, fly, and rust complained of. *Bladen:* Fultz wheat very fine. *Stokes:* Heads well filled; rust on the blades, but too late for the grain; fly in a few fields. *Clay:* Acreage reduced ten per cent., but prospect good. *Jackson:* Fultz wheat looks well; stood the winter better than the Tappahannock. *Pasquotank:* Not half a crop; rust reported. *Gaston:* Crop a full average. *Moore:* Above average. *Perquimans:* Rusted as usual; prospect poor. *Alamance:* On rich lands recent rains have greatly recompensed the losses from winter-killing and the fly. *Rockingham:* A fine crop. *Haywood:* Winter wheat a good stand but heads low. *Stanley:* Early wheat promising; later, somewhat rusted; Fultz wheat tillers well, has a large head and promises a full crop. *Montgomery:* Crop over average.

South Carolina.—*Greenville:* Early-sown fall wheat looks well; late-sown suffered from drought. *Union:* When sown before December, on well-prepared ground, the crop looks well. *Chesterfield:* Somewhat winter-killed, but looks well, especially Fultz wheat. *Lexington:* Dry weather favorable; first-rate yield promised. *York:* Looks well. *Anderson:* More than half the crop is out of danger. *Orangeburgh:* Looks very well.

Georgia.—*Muscogee:* Looked well during winter and spring, but lately rusted. *Murray:* Crop, a full average. *Hancock:* Fultz wheat looking well. *Putnam:* Area small; yield good. *Oglethorpe:* Winter crop daily improving; culture careless. *Fayette:* Injured by drought. *Forsythe:* Looks finely, and promises a full yield of good grain. *Wilkes:* Cut earlier than ever; Tappahannock, the best for flour, but ten or fifteen days late. *Cobb:* No rust; splendid yield promised. *Brooks:* Fultz wheat luxuriant, but grains small. It would do well under good conditions. *Marion:* Fultz wheat looks fine. *Chattooga:* Prospect materially improved. *Sumter:* Acreage small; crop injured by drought and rust. *Butts:* Stand poor, but grain good; suffered from wet and cold. *Madison:* Dry weather has made the crop very fine. *Milton:* Crop fine; well filled; no rust.

Alabama.—*Marshall:* Wheat harvest the best in twenty years. *Lawrence:* Unusually promising. *Clark:* Department wheat rusted. *Calhoun:* Full average; Fultz wheat fine; from 50 to 75 grains on each head; ripens as soon as other wheat sown fifteen days earlier; no rust. *Limestone:* Some rust on blades, but no serious damage.

Mississippi.—*Lee:* Promises an extraordinary yield.

Texas.—*Johnson:* Crop unusually large. *McLennan:* Average yield, 25 to 30 bushels per acre. *Gillespie:* Tappahanock will yield largely; better than last year. *Upshur:* Acreage about the same as last year; condition superior. *Red River:* Harvest ten days late; yield large. *Grayson:* Tappahannock and Fultz wheat fine. *Hunt:* Fultz wheat a larger yield than native grain.

Arkansas.—*Independence:* Fultz wheat exceedingly promising.

Tennessee.—*Loudon:* Filling better than for several years. *Jefferson:* Fultz wheat sowed late, but looks fine. *Henry:* Looks fine; greatly improved. *Greene:* Generally promising; fly reported in some localities; Fultz shows larger heads than the Tappahannock; no rust. *Sullivan:* Damaged by the fly; many fields pastured or plowed up; a good harvest will be gathered from well-prepared lands. *Weakley:* Yield better than for many years; crops lately have been poor. *Wilson:* Area less than last year, but the quantity produced will be greater. Early sown on good land, wheat will yield this year above average; seeded late on thin soil, it will be poor; some rust on blades. *Coffee:* Rust has appeared. *Rhea:* Good crop. *Putnam:* Severely damaged by freezing, but now looking better. *Dickson:* Rust on blades. *Hancock:* Acreage reduced; rust in some places, but the condition promising on the whole. *Granger:* Promising, especially Fultz wheat. *Roane:* Thin stand, but fine heads; Department wheat especially promising. *Robertson:* Early wheat fine; late shortened by drought. *Knox:* Improved since the close of the May drought; Fultz especially fine. *Wayne:* Good. *Monroe:* Straw light and blades rusted, but heads filling well; quality excellent. *Lincoln:* Blades rusted.

KENTUCKY.—*Shelby:* Thin, but heading beyond expectation. *Nicholas:* Fair crop of winter wheat. *Mercer:* Crop abundant. *Daviess:* Recent rains have redeemed an unpromising crop; prospect better than for ten years. *Laurel:* Injured by heavy rains. *Grant:* Badly winter-killed; Fultz wheat looks badly, though the spring has been favorable. *Henry:* Crops fair. *Laurel:* More promising than for several years. *Butler:* Beginning to rust. *Rockcastle:* Indications of rust. *Anderson:* As fine as ever known. *Graves:* Yield quadruple any former one. *Adair:* Crop not large, but looks well.

WEST VIRGINIA.—*Pocahontas:* Suffered from winter freezing. *Hardy:* Not over a half crop. *Harrison:* Winter killed and injured by drought. *Randolph:* Below average; winter-killed. *Taylor:* Better than last year. *Cabell:* Below average. *Nicholas:* Half crop; winter-killed. *Tyler:* Half a crop.

OHIO.—*Noble:* Not over a fourth of a crop; winter-killed, and injured by drought. *Logan:* Protracted fall drought, secured but a feeble growth. A large area has been plowed up for oats. *Scioto:* Seasonable spring rains will probably compensate for reduced acreage; spring-wheat looks well. *Warren:* Badly injured by frost; spring crops abandoned. *Medina:* May average two-thirds of a crop; spring-wheat acreage reduced one-half. *Defiance:* Retarded by fall and spring drought. *Monroe:* Some good fields, but many will not pay for cutting. *Pickaway:* Badly winter-killed, and afterward injured by drought and flies; not over a half crop. *Fairfield:* Badly frozen out *Coshocton:* Winter-wheat almost a total failure. *Wyandot:* Plenty of fly. *Greene:* Fly bad, eating whole fields. *Allen:* Injured by hard winter and dry spring. *Franklin:* Severe drought, poor tillage, and Hessian fly have made the poorest crop of winter wheat for many years. *Crawford:* Not half a crop; broadcast nearly all winter-killed; early drilled as good as usual. *Carroll:* Largely winter-killed. *Henry:* Early sown fields a full average. *Delaware:* Crop exceeds expectations. *Lorain:* Spring-wheat never better. *Adams:* Crops twenty-five days late; greatly improved during the first half of May. *Champaign:* Badly winter-killed; drought and fly injurious. *Geauga:* Greatly improved; nearly average.

INDIANA.—*Elkhart*: Below average, but greatly improved by late rains. *Ohio:* Greatly improved by seasonable rains and fine weather. *Madison:* Very poor before the late rains, which have greatly revived the crop. *Gibson:* Fine since the spring rains, but threatened by the army worm. *Perry:* Fair crop. *La Grange:* Early sown on well-prepared ground promises a good crop; where sown on corn ground just cleared the wheat will not be worth cutting; late rains favorable. *Kosciusko:* Injured by frost May 3. *Johnson:* Not over a half crop. *Washington:* Many fields injured by the fly. *Miami:* Australian white wheat from the Department looks well. *Scott:* Tappahannock injured 25 per cent. by fly; Australian white came up finely, but has been almost swept by the fly; Fultz doing well. *Morgan:* Wheat ranges from extra good to very indifferent. *Noble:* Late rains have improved wheat; early drilled a full average; late sown but a half crop; on corn ground not over a half crop; the county will average about two-thirds of a crop. *Saint Joseph:* Winter crop looks well in spite of bad weather. *Randolph:* Never looked worse; early sown badly frost-killed. *Wayne:* Almost a total failure from fly; perhaps one acre in ten will be cut. *Owen:* Rains too late except to fill the berry. *Marshall*: Harvest late. *Hamilton:* Good crops in some fields; almost none in others. *Posey:* Prospect good; Fultz entirely winter-killed. *White:* Wheat will head short without speedy rain. *Stark:* Spring-wheat from the Department looks splendid. *Warren:* Winter crop good in some places, in others not; chinch-bug at work. *Knox:* Improved to nearly an average. *Franklin:* Upland wheat generally damaged by the fly; on stout land and bottoms it looks well; Australian white spring ruined by the fly; Fultz looks as well as any other, heading early. *Harrison:* Thin on the ground and injured by the fly. *Dubois:* Well headed. *Decatur:* Badly damaged by dry fall and cold winter; very thin except where drilled on fallow ground; fly at work.

ILLINOIS.—*Pike:* Not half a stand; too deeply sown. *Lee:* Looks fine. *Tazewell:* Insects in the crop. *Cumberland:* Harvest two weeks late. *Fayette:* Looks well, though a few fields have been injured by the chinch-bug. *Perry:* Chinch-bugs very destructive. *De Witt:* Generally winter-killed. *Clinton:* Fly at work. *Boone:* Spring-wheat greatly reduced by chinch-bugs. *Menard:* Winter-wheat badly winter-killed; spring crop injured by drought. *Randolph:* Greatly improved. *Clarke:* Greatly improved by fine weather. *Franklin:* Winter-wheat 20 per cent. injured by chinch-bugs; Fultz wheat doing well, though sown late. *Ogle:* Spring-wheat unpromising. *La Salle:* Promising. *Logan:* But little spring-wheat. *Gallatin:* Prospects better than for several years. *Stephenson:* Looks well. *Wabash:* Fly has cut down the crop one-half. *Saint Clair:* Heading unusually large. *Jersey:* Good on timber lands, but weedy and thin on prairie land. *Edgar:* Promising. *Cass:* Not over half a crop winter-wheat; spring-wheat looks well. *Lawrence:* Chinch-bug and fly have cut down the crop one-half. *Crawford:* Chinch-bugs have done terrible damage. *Putnam:* Badly winter-killed, including Fultz. *Richland:* Fly and chinch have cut down the crop to half an average. *Hancock:* Terrible ravages of fly and chinch.

MICHIGAN.—*Washtenaw:* Wheat doing fine; crop about two-thirds; much old wheat

left over. *Kalamazoo:* Greatly injured. *Mecasta:* Better than for years. *Emmett:* Greatly improved; spring crop acreage reduced. *Lapeer:* Badly winter-killed. *Oakland:* Poorly, late sown last fall; greatly injured by unfavorable winter and spring. *Calhoun:* About average; drilled better than broadcast. *Ottawa:* Stand thin but doing well. *Tuscola:* Winter crop light. *Wayne:* Looks well on sandy soil; spotted on clay land. *Van Buren:* Looks well. *Newaygo:* Nearly average; much benefited by cool, damp weather. *Clinton:* Largely plowed up; not a fourth of a crop. *Sanilac:* Almost a total failure; nine-tenths plowed up. *Shiawassee:* Prospects brighter. *Livingston:* Poor show. *Montcalm:* Badly winter-killed. *Berrien:* Spring rains very beneficial.

Wisconsin.—*Walworth:* Winter-wheat looks well, but the acreage is small and decreasing. *Juneau:* Looks fine; never better. *Fond du Lac:* Harvest four weeks late. *Pierce:* Winter wheat on prairie soil badly winter-killed. *Saint Croix:* Spring crop fine. *Calumet:* Spring acreage small. *Waukesha:* Late snow; spring crop 10 per cent. above average. *Sheboygan:* Spring-wheat looks well. *Grant:* Promising. *Bayfield:* Acreage small, but crop promising.

Minnesota.—*Meeker:* Looks well. *Waterman:* Fine promise; no winter-wheat. *Blue Earth:* Acreage decreased. *Freeborn:* Spring sowing late. *Fillmore:* Looks splendidly. *Nebraska:* Stand excellent. *Jackson:* Looks well. *Steele:* Promising. *Houston:* Unusually good.

Missouri.—*Caldwell:* Almost a failure. *Greene:* Prospect better; probably three-fifths of a crop. *Platte:* Scarcely a good acre. *Barton:* Almost a total failure; no spring-wheat raised. *Harrison:* All winter-wheat, except early sown, a failure; spring-wheat doing well. *Polk:* Almost a total failure, including Fultz, through bad weather and insects. *Buchanan:* Almost a failure; Fultz entirely frozen out. *Newton:* Half winter-killed. *Moniteau:* A failure; chinch bugs in vast numbers. *Crawford:* Fine prospect ruined by chinch bugs. *Boone:* Poorer than for thirty years. *Cole:* Drilled wheat a good stand; broadcast poor. *Putnam:* Looks well; chinch-bugs restrained by the cold. *Holt:* Winter-killed. *Daviess:* Winter-killed. *Stone:* Injured by cold and insects; not over a half crop; *Cass:* Badly winter-killed. *Vernon:* Drilled wheat average; broadcast one-fourth; much of it plowed up. *Montgomery:* Much wheat plowed up. *Carroll:* Spring-wheat splendid; winter crop a failure. *Livingston:* Broadcast a failure. *Taney:* Prospect brightening; almost an average. *Macon:* The best districts a fourth of a crop. *Nodaway:* Winter-wheat ruined. *Saint Louis:* Half a crop. *Benton:* Very unpromising. *Morgan:* Winter-killed; yield less than in twenty years. *Callaway:* Badly winter-killed. *Jasper:* Better than was expected. *Howard:* Good upon dry rich land. *De Kalb:* May make seed. *Shelby:* Winter-killed. *Franklin:* Chinch-bug. *Hickory:* Winter-killed and eaten by chinch-bugs. *Marion:* Chinch-bug. *Barry:* Half winter-killed.

Iowa.—*Cedar:* Growing finely. *Shelby:* Stand excellent, but the rains have made fields on river-bottoms quite weedy. *Audubon:* Prospect good; no winter-wheat raised; too liable to winter killing. *Guthrie:* Frequent light rains have brought out the crop finely. *Buchanan:* Spring-grain growing so fast that it has been pastured to prevent mildew. *Muscatine:* Winter crop injured by drought; spring crop restricted in acreage by wet and by fear of chinch-bugs. *Johnson:* Winter wheat poorer than for years; spring-wheat much better. *Madison:* Winter-killed; not over half a crop. *Chickasaw:* Looks well. *Bremer:* Looks well, but inclines to straw. *Calhoun:* Fultz winter killed; White Australian looks well. *Cherokee:* Season fine for wheat. *Harrison:* Winter crop ruined; spring crop growing too fast. *Tarma:* Spring-wheat looks well. *Buena:* Fultz winter killed. *Mitchell:* Spring-wheat promising. *Lee:* A small white worm, resembling the Hessian fly, has attacked the crop; Australian spring-wheat did well.

Kansas.—*Chase:* Early-sown fields sheltered from the north wind look well, but many others are frozen out; crop but two-tenths of last year notwithstanding an increased acreage. *Douglass:* Winter-wheat a failure; spring-wheat looks well, but acreage small. *Labette:* Winter-wheat improving; spring crop good—the first in the county. *Bourbon:* Chinch taking the remains of the crop. *Johnson:* Mostly frozen out. *Shawnee:* A failure; small area of spring-wheat. *Sedgwick:* Frozen out. *Marshall:* Mostly plowed up for spring crops. *Leavenworth:* Frozen out; chinch taking the remains. *Orange:* Badly winter-killed though drilled in good corn-ground. *Morris:* Almost a failure. *Cherokee:* Many fields are coming out wonderfully in the fine weather. *Nemaha:* Winter-killed; mostly plowed up. *Washington:* Badly winter-killed; spring-wheat largely sown. *Ellsworth:* A failure. *Montgomery:* Drilled wheat looks well; broad-cast winter-killed. *Riley:* Nearly a total loss. *Marion:* Mostly plowed up. *Republican:* Badly winter-killed and plowed up. *Osage:* Winter-killed and eaten by chinches. *Saline:* Almost totally winter-killed.

Nearaska.—*Jefferson:* Very poor, especially the late sown. *Cedar:* Prospects favorable. *Boone:* No winter grain. *Gage:* Winter-killed; spring crop looks well.

Dakota.—*Bon Homme:* Spring-wheat looks very well.

INDIAN TERRITORY.—*Cherokee Nation:* Wheat slowly recovering from the great storm of May 17.

UTAH.—*Box Elder:* Winter crop not a success: largely plowed up. *Weber:* Looks fine. *Cache:* Injured by frosts; spring grain benefited by late rains and is excellent. *Morgan:* Sowing delayed by fear of grasshoppers, which are not one-fourth as numerous as last year. Volunteer wheat will bring 50 per cent. of a crop.

CALIFORNIA.—*Placer:* Acreage increased 10 per cent.; wet winter has reduced the promise of a fine crop. *Sonoma:* Early rains in excess and subsequent drought cut down the crop 40 or 50 per cent. below average. *Sacramento:* Late-sown grain a failure: extensively cut for hay. *San Bernardino:* Rusted by hot winds and sea-fogs. *Humboldt:* Acreage increased. *Stanislaus:* Average 12 bushels per acre; early sown, good; late sown, mostly made into hay. *San Joaquin:* Better than since 1869. *Tuolumne:* Crop light. *Amador:* Distinction between winter and spring grain almost unknown. *El Dorado:* No spring grain.

COTTON.

An increase is reported in the cotton area in every State. A very small proportion of county returns show a decrease of acreage. Planting was generally delayed by a protracted season of drought, and fields that were planted late occasioned some trouble in obtaining perfect stands; but the recent rains, and renewed efforts in replanting, have finally secured stands of average completeness. The percentage of increase in area—last year's crop being the basis of comparison—is as follows: North Carolina, 16 per cent.; South Carolina, 9 per cent.; Georgia, 12 per cent.; Florida, 10 per cent.; Alabama, 11 per cent.; Mississippi, 10 per cent.; Louisiana, 11 per cent.; Texas, 18 per cent.; Arkansas, 16 per cent.; Tennessee, 12 per cent. The average increase throughout the cotton States will approximate 13 per cent. Texas has naturally made the largest relative increase, not only having enjoyed a favorable season for planting, but also during the past year having received accessions of emigrants who are cotton-planters. The condition of the plant throughout the cotton section is very nearly a full average. Separating the Atlantic from the more western States, the former stand a little below an average. The latter are fully up to the standard of a fair condition. The drought which prevailed in April and the first half of May delayed the growth, and the cold nights in the more northern belt had a further retarding effect, but the abundant rains and genial temperature which followed have wonderfully invigorated and advanced the crop. The following figures represent the condition of cotton in the several States, one hundred standing for an average: North Carolina, 96; South Carolina, 92; Georgia, 96; Florida, 95; Alabama, 105; Mississippi, 100; Louisiana, 104; Texas, 100; Arkansas, 98; Tennessee, 101.

Four counties in Virginia report the culture of cotton, viz: York, Southampton, Prince George, and Surry. A small increase of area is shown, and condition a little below average. Virginia is not reckoned a cotton State.

Thirty-five county reports are received from North Carolina, all showing enlarged acreage, except Mecklenburgh, Rowan, Wilkes, Surry, Lenoir, Catawba, and Alamance, which give the same area as last year. Eighteen place condition below 100. The following extracts show local peculiarities:

Northampton: Cotton area increased 10 per cent.; stand good, and prospects as favorable as usual. *Mecklenburgh:* Cotton prospect worse than for ten years. A heavy, beating rain-storm just after planting, followed by dry, baking weather, prevented its coming up. *Chowan:* More cotton planted than ever before; the dry weather kept it back, but late rains have produced a very good stand. *Pitt:* Rains have produced a good stand, in spite of previous drought, but have also brought forward the grass. A larger area planted than last year, and less labor available for its culture. *Camden:*

Cool weather has retarded the growth of cotton; stand poor. *Rowan:* Doing well. *Bladen:* Planting late and hurried; only ordinary stands, on account of the drought at planting. Nights too cool for its rapid growth; dying out to some extent. *Duplin:* Unusual amount of commercial manures used; late starting, but good stands obtained. *Pasquotank:* Area doubled; cool, dry weather has prevented a good stand; crop will probably be short. *Gaston:* Very unpromising. *Sampson:* Cotton-planting late, but stand unusually good; crop looks finely. *Moore:* Cotton planted late, but looks well; stand good. *Perquimans:* Cotton area doubled; stands good; cotton displacing the wheat-crop. *Coahoma:* Earlier planted cotton looks well. *Stanly:* Drought in April and May will shorten the crop. *Montgomery:* The crops three weeks in advance of last year. *Jones:* Prospect never better, but labor scarce.

Every report from South Carolina, except that from Newberry, (which is 100,) increases the area of last year. Fairfield stands highest in condition, at 110; Marlborough and Livingston, 100; and twelve counties reported stand below average.

York: There is an increase of acreage; but six weeks of drought after planting has put the crop back very much. The stand is good, except where it was planted very early. *Anderson:* Has suffered much from drought. Half of what was planted in May is at a poor stand, but it generally looks strong and healthy. Fertilizers have been freely used. *Williamsburgh:* Late in coming up, and the stand not very good, but the growth has been rapid, the tilth good, so that the prospect is favorable, take it altogether. *Orangeburgh:* Looks fine; favorable season. *Fairfield:* Cotton area increased; more fertilizers used; labor less abundant and available; crop retarded by the late spring and lack of rain up to May 16, since when fine rains have produced a great improvement. Stand good. *Union:* In the northern part of the county the stand is good, and the season has been favorable for cultivation, but in the southern part there has been very little rain since April 8, and it is unpromising. *Edgefield:* The stand is imperfect owing to continued drought over much of the county since the early part of April. The indications do not point to a larger crop than last year's. *Richland:* The stand is very imperfect, much not yet up, and much land too hard and dry to break up. *Marlborough:* That planted early in April came up well and is very promising, while late-planted cotton has not yet received the first working, and will require a late fall to make a good crop. *Newberry:* The stand is very poor owing to cool nights and drought during spring. Many crops have been replanted entire, the second crop just coming up; more fertilizers used than last season, and the crop may be an average one, though the prospect is not encouraging.

Very full returns are received from Georgia, numbering sixty-three, and representing as many counties. The only counties in which the cotton area appears to be diminished are Worth, Schley, Troup, Heard, Greene, Pike, Newton, Liberty, and Charlton. Among the principal cotton counties, Pickens claims an increase in area of 30 per cent., Gordon of 25, and Dawson and Coweta of 20, and Hancock of 5 per cent. Thirteen reports claim condition above average from 5 to 25 per cent., among which are Gordon, Schley, Lee, Glynn, Brooks, Walker, Putnam, and Milton.

Stewart: Stands good; bottoms all planted and doing well; promises better than for several years. *Madison:* Stand bad, but condition good. *Glynn:* Three weeks late, but in good condition. *Marion:* Looks well. *Upson:* Increased use of fertilizers, but drought has injured the crop. *Lee:* Twenty per cent. of cotton crop not up; planted late on account of drought. *Greene:* Stand small and late. *Troup:* Poor cotton stand; plants sickly. *Heard:* Bad stand. *Clayton:* Cotton mania raging; 200 tons of fertilizers bought on credit; crops mortgaged for provisions. *Chattooga:* Unusually good stand. *Laurens:* Drought has greatly injured the prospect. *McDuffie:* Favorable weather, and guano are pushing the crop. *Gwinnett:* Late rains have improved cotton. Immense quantities of commercial manures used. *Johnson:* Acreage devoted to cotton increased 10 per cent., but drought prevented the planting of the whole. *Twiggs:* Very backward, but good stands secured. *Richmond:* In better condition than usual. *Fulton:* Drought has caused much cotton to be plowed up. *Sumter:* Bad stands. *Butts:* Drought in May made poor stands *Muscogee:* Doing well where there is a stand. *Walton:* Season unfavorable. *Harris:* Dry weather of May prevented the cotton from coming up well. *Columbia:* Bad stand; weather and seed complained of; a good, warm rain may yet bring it out. *Newton:* Stand pretty good, but plants small. *Putnam:* Stand first-rate, but a full month late. *Oglethorpe:* A tolerable stand, and late, but improving. *Fayette:* Stands good. *Chattahoochie:* Prospect average; better than last year. *Wilkinson:* Stands poor; in some

cases few or no plants are up. *Forsyth:* Generally a fine stand, but late: caused by drought. *Hancock:* Late planting, but stands good: condition good, but backward. *Wilkes:* Stands unsatisfactory; alleged causes: 1st, defective seed; 2d, drought from May 5 to 20; 3d, casualties after the plant is up. Late planting decidedly the best. *Cobb:* Late rains have improved cotton. *Douglass:* Stand short, through drought.

Only two counties in Florida return a decrease of area, but there is much variation in the reports of condition.

Jackson: Three weeks behind in sowing, but generally clean and looking well. *Liberty:* Cotton-seed on rolling land considerably washed out; on level land greatly rotted. The seed had been considerably heated after gathering, destroying its germinating principle. The crop will be 25 per cent. short. *Leon:* Increase of cotton area due to negroes putting their patches in cotton instead of corn. *Hamilton:* Doing well: stands drought better than other crops. *Bradford:* Looks well; promises more than an average crop. *Orange:* Stand poor. *Suwanee:* Late, wet, and cold spring makes the cotton crop backward; cut-worms injuring the late plantings. *Levy:* Early cotton doing well; late cotton ruined. *Wakulla:* Prospects better than usual.

Bibb and Jefferson are the only counties in Alabama which return a diminished acreage; ten report the same as last year, and the remainder make an increase ranging from 5 to 25 per cent. About one-third of the reports indicate condition below average, and the remainder are nearly equally divided between high condition and an average.

Montgomery: Late in coming up. Crops small but clean, and looking well: acreage reduced and condition inferior to last year. *Franklin:* Late hot weather favorable to cotton; no insects infesting it. *Marshall:* Early planted above average. *Tuscaloosa:* Looks unusually well. *Autauga:* Looks well; cleaned by the drought of grass and weeds. *Conecuh:* Area somewhat larger than last year. Early planted cotton looks well. *Lawrence:* Late but promising. *Colbert:* Heavy stand, growing fast; much of it, late planted, will be in danger from late frosts. *Greene:* Season dry, but favorable to cotton, especially on low bottoms. *Cherokee:* Suffering from excessive moisture; stand good, but the growth is injured by insects, especially the flea-bug. *Sumter:* Drought has retarded cotton growth. *Clarke:* Late in coming up. *Dallas:* Promises an abundant yield. *Morgan:* A good stand in spite of drought; it looks healthly and promising. *Clay:* Complaints of bad stands. *Randolph:* Recent rains have improved cotton. *Crenshaw:* Imperfect stand. *Lauderdale:* Growing well.

Notwithstanding the delay and apparent injury from drought in April and May in Mississippi, reports of condition are comparatively favorable, the average standing at 100. A large proportion of the counties claim increase of area, the total increase being 10 per cent.

Winston: Came up badly until after the rain of May 21: very late, but looking finely. *Smith:* Looks promising, except on low bottom-lands, where heavy rains the latter part of May injured it much. First forms seen May 20. *Bolivar:* Very late. Little came up till after May 23, and, unless the fall is very favorable, the crop will be short. *Grenada:* The severe drought caused a bad stand; but rains have improved the appearance. *Kemper:* Early cotton looks well, but some is not yet planted, and the stand is generally not good. *Noxubee:* Excellent condition; stand good. *Newton:* Doing very well, the short drought allowing planters to get it clean; stand good; late favorable rains. *Wayne:* Drought helped cotton by giving opportunity to clean it. *Warren:* Imperfect stand of cotton from drought. *Pike:* Drought has injured cotton. *Amite:* Late cotton injured by drought; but a good crop is expected. *Lowndes:* Doing well. *La Fayette:* Late, but a good stand, and looks well. *Holmes:* Very late and small, and the stand bad, owing to unprecedented dry spell in April and May; much of the cotton did not come up till after May 25. *Yazoo:* Two weeks later than last year, owing to drought in April and May, but rains general since and crops improving rapidly. *Neshoba:* Condition below that of last year, owing to the dry spring. *Rankin:* Has improved wonderfully since the middle of May. *De Soto:* Doing well. *Jefferson:* Looking well, but complaints of bad stand from early drought of one month. *Yalabusha:* Healthy and in fine condition; considerable complaint of bad stands.

Returns are received from twenty-one parishes in Louisiana, of which only West Feliciana, Saint Helena, and Franklin report decrease of area. The center of cotton-growing in the State, Tensas Parish, reports an increase of 10 per cent. in area, and condition 20 and above average.

Union: In better condition than at the same time any year since 1865. *East Feliciana:* Quite up to average; blossoms reported near the Mississippi as early as May 28. *Morehouse:* Several weeks later than usual, but looks well, though it has been injured by heavy rains for several days past. *West Feliciana:* Early cotton generally looking well, though somewhat injured by lice, and the stand not good. That planted late coming up badly. Cotton-caterpillar reported in small numbers on several plantations. *Richland:* Stand good, but condition rather below average. *Ouachita:* In fine condition, good stands, well worked. *Madison:* Good stand, and nearly worked over first time. *East Baton Rouge:* Three weeks later than usual, but in good condition. *Carroll:* Fine condition; better than last year.

Nearly all the Texas returns indicate enlarged area, and the average increase is placed at 18 per cent. The season has generally been favorable for planting and for the growth of the plant. The prospect for an average crop is good.

Henderson: Cotton looks well in spite of the late season, showing considerable improvement in culture. *McLennan:* Cotton very good. *Milan:* Best cotton prospect for many years. *Upshur:* Increased cotton acreage; condition inferior, on account of cool weather. *Titus:* Cotton mania raging. *Matagorda:* Cotton-worms reported. *Lavaca:* Cotton stands excellent, especially where early planted.

The returns from Arkansas indicate very nearly an average condition of cotton.

Marion: Ten times the area of last year. *Jackson:* Generally in grass, and being hoed and plowed so wet as to cause injury, it is feared. Hoe hands ask $2 per day. Increase of 25 per cent. in acreage. *Independence:* Increase of 20 per cent. in area, but heavy rains have interfered with cultivation. *Crittenden:* Looks indifferent. The seed lay in the ground five weeks, owing to drought. *Columbia:* Generally came up well, but the stand was slightly injured by the recent heavy rains; 20 per cent. increase in acreage. *Pulaski:* Damaged very much by continuous rains; poor stand. *Woodruff:* Came up late and irregularly; cut-worms bad; labor scarce, owing to the building of railroads in the vicinity. Some land lying idle.

The Tennessee returns indicate excellent condition and increase of area.

Giles: People cotton-crazy; planting an unusual quantity—a suicidal policy for Middle Tennessee—and neglecting grains and grasses. *Fayette:* Crop backward; retarded by backward spring. No planter has yet secured a stand. Seed not injured in the ground, and rain will bring it out. *Wayne:* Good condition, and larger area than usual. *Wilson:* Large increase in acreage; condition good. *Lauderdale:* Stand poor and small from drought.

CORN.

The area of corn is not included in the June circular, the planting in many States not being finished. The returns made are therefore voluntary. The information received shows that planting has been late and cut-worms unusually prevalent. A full report of area and condition will be given in the July number.

NEW YORK.—*Livingston:* Corn planted in good order and season. *Fulton:* Very backward. *Ontario:* Coming up yellow.

NEW JERSEY.—*Hudson:* Promises well.

PENNSYLVANIA.—*Greene:* Coming up badly. *Susquehanna:* Yellow and backward. *York:* Late rains have made corn promising. *Centre:* Not growing fast. *Beaver:* Cold May made corn yellow and backward. *Indiana:* Coming up very irregularly; cut-worms taking it rapidly. *Lebanon:* Coming up well. *Lawrence:* Not doing well.

MARYLAND.—*Baltimore:* Cut-worms and ants injuring the corn. *Cecil:* Generally late planted, and did not come up well. *Kent:* Has not suffered much from the drought. *Washington:* Doing well, owing to recent rains. *Charles:* Bad stand now, but not too late for remedy from replanting.

VIRGINIA.—*Spottsylvania:* Late planted. *Henrico:* Area increased one-third; coming up badly. *Surrey:* Has come up badly, and is troubled with bud-worms. *Richmond:* Drought has badly injured corn. *King and Queen:* Did not come up, owing to drought. *Highland:* Comes up poorly, and is devoured largely by cut-worms. *Rappahannock:* Stands very badly; many replanting; cut-worm at work; drought keeps the corn from recovering from its ravages. *Bath:* Cut-worms cut down the corn as fast as it comes up. *Mecklenburgh:* Heavy rains at corn-planting, followed by baking sunshine

and high winds, formed a hard crust, which was difficult for the corn to break through. *Fairfax:* Coming up badly. *Augusta:* Came up poorly; where shallow-planted not at all. *Prince William:* Cannot sprout without rain. *Henry:* Well worked; looks well. *King George:* Bud-worm destroying corn.

North Carolina.—*Northampton:* Area about as usual; crop looks well. *Randolph:* Hopeful. *Chowan:* Looks well. *Camden:* Doing well, but the stand is below average. *Bladen:* Clean and looking well. *Sampson:* Late but good. *Perquimans:* Looks well, and in good order. *Coahoma:* Crop good. *Stanley:* Injured by drought, and cut down by a black worm of the size of the *Pyralis*, which infests the grape-vine; some farmers have got but a third of a stand on the third planting. *Jones:* Prospect never better.

South Carolina.—*Richland:* The stand poor; much not yet up. *Williamsburgh:* Fair prospect. *Orangeburgh:* Favorable season; looks fine.

Georgia.—*Glasscock:* Looks badly, and farmers anxious about it. *Chattahoochee:* Average prospect; better than last year. *Forsyth:* Fair, but uneven; the bud-worm prevented an early stand. *Twiggs:* Small, but healthy. *Stewart:* Good. *Madison:* Stand bad, but condition good. *Decatur:* Suffering greatly from drought.

Florida.—*Jackson:* Neglected; three weeks behind in planting. *Bradford:* Suffering somewhat. *Manatee:* Yellow field-corn from the Department looks well in spite of drought; it is two weeks earlier than native corn. *Levy:* Nearly ruined; an immediate rain may make half a crop. *Wakulla:* Drought damaging; not one-half a crop will be gathered.

Alabama.—*Marshall:* Early corn looks well. *Tuscaloosa:* Crop fine. *Autauga:* Late, but looking well. *Conecuh:* Looking badly, but improved by late rains. *Macon:* Full average. *Lawrence:* Late, but promising. *Colbert:* Early corn promising; late-planted poor. *Greene:* Late fine rains have improved the corn. *Cherokee:* Two late heavy rains have greatly improved the corn. *Dallas:* Area increased 10 per cent.; crop promising. *Randolph:* Corn-stand imperfect, but improved by recent rains. *Crenshaw:* Pennsylvania yellow corn from the Department looks well. *Lauderdale:* Clean and healthy.

Mississippi.—*Newton:* Very good. *Wayne:* Rather benefited by the drought, in giving a chance to clean it. *Warren:* Increased acreage; looking as well as could be expected. *Pike:* In fine condition, owing to dry weather. Pennsylvania corn threatens to be a failure. *Amite:* Good crop expected. *Hinds:* Above an average. It is the crop we should be most interested in. *Lowndes:* Doing well. *Holmes:* Bad stand; stunted and small; much of it too much so to recuperate. *Yazoo:* Two weeks later than last year, owing to drought in April and May, but rains have since been general, and crops have improved rapidly. *Rankin:* Has improved wonderfully since the middle of May. *De Soto:* Doing well. *Jefferson;* Promising better than last year. *Winston:* Looks finely. *Smith:* Pennsylvania corn, from the Department, in silk May 20; other corn waist-high. *Bolivar;* Very late; not much came up till after May 23. *Grenada:* Has kept a good color, but the stand is bad. *Kemper:* Looks promising. *Noxubee:* Fine in spite of drought.

Louisiana.—*East Feliciana;* Unusually promising; season favorable. *Bossier:* The yellow prolific corn, planted March 15, is now in tassel, and can be laid by in time to work cotton. *Morehouse;* Several weeks later than usual, but looks well. *Richland:* Acreage increased and stand good, after a second planting, in many places. *Ouachita:* Good stand, and in fine condition. *East Baton Rouge:* Ten per cent. increase in acreage, and condition good. *Carroll:* Has suffered severely from the attacks of a very small bug. Some farmers have replowed more than once.

Texas.—*Henderson:* Looks well; better cultivated than formerly. *Cherokee:* Crop backward. *McLennan:* Crop estimated at 40 to 60 bushels per acre. *Milam:* The best prospect for corn for many years. *Kendall:* Pennsylvania corn, from the Department, on the 26th of May had distinctly formed ears. *Lavacca:* Roasting-ears for two weeks, from the Pennsylvania corn sent by the Department.

Arkansas.—*Newton:* Below average condition, owing to wet spring. *Independence:* Cultivation greatly interfered with by heavy rains. *Columbia:* Looks remarkably well, though a little later than usual.

Tennessee.—*Roane:* Difficult to get a stand, on account of cut-worm. *Knox:* Many fields have been plowed up and replanted, owing to ravages of cut-worm caused by the cool weather; otherwise the crop is doing well. *Wayne:* Condition good. *Loudon:* Very promising. *Sullivan:* Cut-worms have been very destructive, and we are still replanting. If the season is favorable, we will yet make a crop.

Kentucky.—*Russell:* Ground baked hard; much of the corn planted has been replanted. Crop prospects very poor. *Daviess:* Backward, and much trouble with cut-worms. *Henry:* Good stand secured; young plants thrifty.

West Virginia.—*Marion:* Cut-worms very bad, cutting off some fields while disturbing others very little. *Raleigh:* Late planted, owing to drought. *Jefferson:* Has come up indifferently. *Braxton:* Very backward. *Cabell:* Cut-worms destructive. *Upshur:* Early plantings rotted.

OHIO.—*Noble:* Cut-worms bad on sod-ground corn. *Warren:* Large winter-wheat area plowed up for corn. The cut-worm has appeared in the corn-field. *Greene;* Corn making a good start. *Hancock:* Cut-worms destroying whole corn-fields. *Henry:* Corn was planted early and has come up well, but is badly injured by cut-worms. *Lucas:* Cut-worm very destructive. *Lorain:* Cut-worm making sad havoc with new planted corn. *Adams:* Crop doing poorly; cut-worms. *Champaign:* Cut-worms very destructive.

INDIANA.—*Decatur:* Coming up well; planted late on account of cut-worms. *Grant:* Injured seriously by cut-worms. Crop prospects poor. *Madison:* Cut-worms very destructive, delaying the planting on stubble and sod lands. *Perry:* But half planted. *Johnson:* Cut-worms have destroyed the first planting of many corn-fields. *Boone:* All corn on sod and stubble ground destroyed by cut-worms. *Fayette:* Acreage increased 25 per cent.; condition about 80 per cent.; cut-worms bad. *Noble:* Cold weather made late planting. *Wayne:* Worms and insects destroying the crop. *Howard;* Cut-worms have been very destructive. *Owen:* Good condition except for the recent washing rains. *Marshall:* Late, and cut-worms bad. *Hamilton:* Cut-worm worse than ever before, keeping corn back very much. *Hancock;* Many pieces of early corn destroyed by the black cut-worm. *Whitley:* Some complaints of cut-worms. *Wells:* Sod-ground corn destroyed by cut-worms. *Franklin:* Much complaint of cut-worms. Much replanting will be done. Ground in good order. *Cass:* Cut-worms worse than ever before. Many fields replanted entire.

ILLINOIS.—*Gallatin:* In the finest condition, promising a very large crop. *Livingston:* Backward, but coming up. *Iroquois:* Planted earlier than usual; cut-worms prevalent in soddy land. *Stevenson:* Planting delayed by wet; crop will probably be short. *Wabash:* Mostly planted, but in general it is not doing well. The cut-worm is injuring it, and the army-worm has appeared in immense numbers in some localities. *Richland:* Planting delayed by wet season. *Saint Clair:* Looks well. *Winnebago:* Slow in growing. *Crawford:* Chinch-bugs threatening. *Putnam:* Looks sickly. *Pike:* Wire-worm destroying many corn-fields. *Lee:* Planting late; earlier plantings had to be renewed; prospects gloomy. *Tazewell:* Injured by cut-worms; the best stand for many years. *Boone:* Planting very late. *Grundy:* Fair stand but slow growth. *Fayette:* Crop looks fair.

MICHIGAN.—*Bay:* Rains rather copious for corn. *Washtenaw:* Weather fine for corn. *Van Buren:* Looks well. *Cass:* Backward. *Shiawassee:* Too cold.

WISCONSIN.—*Walworth:* Acreage increasing. *Richland:* Planting delayed; in some early plantings the seed rotted. *Fond-du-lac:* Looks sickly. *Clark:* Below average; much seed rotted. *Portage:* Weather too cold. *Columbia:* Not looking well. *Adams:* Planting late. *Saint Croix:* Too wet. *Grant:* Late, but presenting a good stand.

MINNESOTA.—*Steele:* Backward. *Freeborn:* Planting late; in some cases the seed rotted in the ground. *Houston:* Very backward.

IOWA.—*Clinton:* Planting two weeks late; not all planted by the 23d of May; very little up; looks bad. *Cedar:* Planting succeeded well. *Guthrie:* Looking well after the light and frequent rains. *Audubon:* Sickly. *Hardie:* Backward. *Howard:* Unpromising. *Madison:* Not coming up well; weather too wet and cold. *Pottawattomie:* Planting delayed by rain. *Winnisheik:* Late planted, and considerably rotted by wet. *Cherokee:* Backward. *Carroll:* Backward. *Jasper:* Five per cent. replanted. *Decatur:* Poor and backward.

MISSOURI.—*Platte:* Ravaged by the grub-worm. *Moniteau:* Planting delayed a month by wet weather. *Clinton:* Looks poor. *Daviess:* But little planted yet. *Pike:* Chinch threatening. *Pulaski:* Rain damaging the crop. *Saint Louis:* Chinch-bugs damaging the crop. *Benton:* Chinch-bugs at work. *Jasper:* Late, but growing fast. *DeKalb:* Area increased. *Perry:* Cut-worms and chinch-bugs. *Marion:* Planting late.

KANSAS.—*Douglas:* Late and just coming up; much ground not yet planted. *Bourbon:* Planting late. *Leavenworth:* Large area still unplanted.

NEBRASKA.—*Hall:* Kept back by cool nights; Deep plantings have rotted.

INDIAN TERRITORY.—*Cherokee Nation:* Great storm of May 17 necessitates a replanting.

OATS.

An increase in the area in oats is given in nearly all the States. The only diminution reported is in Massachusetts, Rhode Island, Connecticut, New Jersey, Maryland, Virginia, North Carolina, Kentucky, and California, varying 86 to 99 per cent. Condition is reported high in every Western State beyond Ohio, in the Southwestern States, and in the northern portion of New England. Notwithstanding the unpromising appearance in the Atlantic States, south of Massachusetts, an increased product may be expected.

VERMONT.—*Orange:* Oats increased in acreage and improved in appearance. *Orleans:* Look well.

NEW YORK.—*Livingston:* Sown in good order and season. *Genesee:* Need rain. *Wyoming:* Small. *Otsego:* Promising. *Rensselaer:* Beginning to grow finely.

NEW JERSEY.—*Camden:* Light on the ground.

PENNSYLVANIA.—*Bucks:* Probably short. *Greene:* Healthy but short. *Lancaster:* Short, but well set; with good weather will make an average crop. *York:* Look promising, on account of late rains. *Centre:* At a stand-still. *Indiana:* Making poor progress.

MARYLAND.—*Frederick:* Almost a total failure. *Howard:* Spring drought prevented the oat-straw from forming fully; both straw and grain will be light. *Queen Anne:* Late sown and short; will make but a poor crop. *Cecil:* Very unpromising. *Kent:* Dried up. *Washington:* Doing well, owing to recent rains.

VIRGINIA.—*Culpeper:* Look badly; without great improvement in the conditions of growth they will not make half a crop. Schonen 90 per cent. of average. *Spottsylvania:* Average sowing a month late; prospects of a poor crop. *Henrico:* A serious failure, especially winter-oats. *Botetourt:* Injured by drought, fly, and joint-worm. *Stratford:* Severely affected by drought. *Giles:* Poor. *Surry:* Acreage slightly decreased and 25 per cent. inferior in quality. *Fluvanna:* Rain has greatly improved the crop but it will be short. *King and Queen:* In a very bad condition. *Orange:* Very short. *Madison:* Very unpromising. *New Kent:* Fall-oats, on thin lands, died out; those on good land will make three-fourths of a crop. Spring-oats, though suffering for rain, look well and will make an average crop. Fall-sown Schonen oats will scarcely make seed; spring-sown Schonen oats will be 50 per cent. better than any others. *Prince George:* Crop suffered from drought. *Bath:* Very short. *Amherst:* Injured seriously by drought. *Nelson:* Exceedingly short. *Fairfax:* Abundant rains may bring up oats to three-fourths of a crop. *Augusta:* Very short. *Prince Edward:* Backward. *Clarke:* Crop worse than for years. *Prince William:* Suffering from lack of rain. *King George:* Sown late, head low, and are very unpromising. White Schonen and Excelsior the best. *Wise:* Much injured by drought.

NORTH CAROLINA.—*Northampton:* Late, on account of drought, but promise to be as good as usual *Randolph:* Promising. *Mechlenburgh:* Injured by drought. *Chowan:* Good, *Rowan:* Stunted by drought, but may be redeemed by favorable weather. *Bladen:* Nearly all killed out. *Gaston:* Badly winter-killed. *Franklin:* Greatly improved by late rains. *Moore:* Greatly injured by drought, but improved by late rains. *Perquimans:* Fall sown better than last year. *Alamance:* Improving, but will not make a good crop. *Haywood:* Injured by drought. *Henderson:* Improving. *Stanley:* Injured by drought. *Montgomery:* Increased acreage and better than average condition.

SOUTH CAROLINA.—*Union*: Fall-sown oats on good clean land, good; spring-sown, very unpromising; harvest has commenced. *Edgefield:* The crop very short from drought; that sown early in cotton land will yield 25 to 30 bushels; late-sown, 3 to 15 bushels; harvest commenced. *Chesterfield:* The red rust-proof oats, introduced from Georgia are the favorite; have been harvested, while the common oats are just heading out. The Schonen oats I sowed were killed by the winter. *Richland:* When sowed in the early fall the yield has been good, but spring-oats are a perfect failure, except in bottom-lands, owing to drought. The rust-proof variety has been universally used. *Darlington:* Considerably injured by a drought of eight weeks in April and May. *Orangeburgh:* Season too dry.

GEORGIA.—*Muscogee:* Heading low, on account of dry weather. *Gordon:* An unprecedented amount of chess or cockle among fall or winter oats. *Murray:* Full average crop. *Glascock:* Very poor; especially spring-oats. *Oglethorpe:* Improving. *Fayette:* Injured by drought. *Forsyth:* Doing well, but low on the ground. *Cobb:* Backward. *Chattooga:* Improving. *McDuffie:* Improving. *Wilkes:* Rains rather too late for spring-oats. *Marion:* Schonen oats sown in November vegetated well but were half killed by winter; the balance rusted. *Upson:* Drought shortened the oats. *Butts:* Shortened by drought in May. *Madison:* Not much sown; spring-oats almost a failure; fall-oats good. *Decatur:* Much damaged.

FLORIDA.—*Jacksonville:* A failure; affording limited pasturage. *Wakulla:* Injured by drought.

ALABAMA.—*Lowndes:* Drought injured the oats. *Blount:* Weather unfavorable. *Conecuh:* Acreage increasing. *Greene:* Drought has materially injured oats. *Sumter:* Culture increasing. *Clark:* Norway oats will not do; the only successful variety is called the non-rusting oats. *Clay:* Drought disastrous; crop too late to cut. *Calhoun:* Oats a little shortened by dry weather. *Lauderdale:* Growing well.

MISSISSIPPI.—*Lee:* Promises an extraordinary yield; Excelsior ahead of all others. *Wayne:* Injured by drought. *Neshoba:* Condition below that of the same date last year, owing to spring drought. *Rankin:* The red oats, generally raised here, proves a valuable variety, and is the only kind which escapes rust; wherever sown late in the fall it has a good growth, and looks promising, but the spring-sown oats look indifferently. *De Soto:* Doing well. *Winston:* Very sorry condition; headed out at a

foot from the ground; unless the late rains cause increased growth they can not be cut; many farmers will have to graze their fields. *Kemper:* Increased area of oats and other small grains. *Noxubee:* Fall-sown tolerably good, but spring-oats nearly a failure; drought has injured the crop much, but the late rains may improve it.

LOUISIANA.—*Morehouse:* Spring oats look well.

TEXAS.—*Gonzales:* Oat-culture a valuable acquisition and increasing; "anti-rust" oats preferred. *McLennan:* Will yield from 40 to 60 bushels per acre. *Upshur:* Acreage doubled; crop prospects fair; rust-proof oats introduced. *Fayette:* Crop 200 per cent. better than any crop within ten years previous. *Galveston:* Badly rusted.

ARKANSAS—*Independence:* Excelsior very promising.

TENNESSEE.—*Campbell:* Winter-oats killed by cold; Chowan oats sown in the spring are doing well. *Rhea:* Injured by drought, but doing better since the late rains. *Grainger:* Drought injured them, but the condition has been improved by recent rains. *Robertson:* Short, owing to dry weather. *Knox:* Owing to the drought the crop will be short; the "White Schonen" looks better than other kinds. *Wayne:* Condition good. *Monroe:* Cut short by drought. *Jefferson:* Schonen shortened by drought. *Weakley:* The crop was abandoned some years ago on account of rust, but it seems to be free from it now, and the area is extending. *Sevier:* Cut short by severe drought. *Wilson:* Heading out and promise well, though the dry weather affected the growth; area unusually large.

KENTUCKY.—*Nicholas:* Injured by heavy rains early in the spring, followed by drought. *Owsley:* Crop very deficient. *Laurel:* Look well, but not equal to last year. *Butler:* Injured. *Meade:* Not sown till April 15. *Russell:* Parched out by drought. *Adair:* Seasonable weather will repair the injury of the dry spring.

WEST VIRGINIA.—*Hardy:* Not over a half crop. *Preston:* Injured by severe drought. *Braxton:* Short and bad. *Kanawha:* Late sown and unpromising. *Jefferson:* Very backward. White Schonen becoming common and are doing better than other varieties. *Harrison:* Not half a crop.

OHIO.—*Scioto:* Look exceedingly well. *Hardin:* On sod ground much injured by cut-worms. *Defiance:* Retarded by fall and spring drought. *Pickaway:* Will be short. *Hancock:* Cut-worms destroying whole fields. *Allen:* Hard winter and dry spring have played havoc. *Auglaize:* Damaged by cut-worms.

INDIANA.—*Grant:* Will be greatly shortened by cut-worms. *Elkhart:* Look first rate. *Perry:* Not so promising as last year, but will probably be a full average. *Washington:* Good. *Scott:* Late sown Birlie oats look well. *Noble:* Look well. *Wayne:* Worms and insects destructive. *Adams:* Some fields entirely destroyed by a worm called "cut-worm," or "army worm."

ILLINOIS.—*Gallatin:* Promise an extraordinary yield. *Saint Clair:* Look well. *Edgar:* Promising. *Cass:* Never better. *Lawrence:* Doing very well. *Crawford:* Chinch-bug threatening the crop. *Clark:* Look well. *La Salle:* Promising. *Marshall:* Acreage increased. *Lee:* Good prospect.

MICHIGAN.—*Tuscola:* Look well. *Washtenaw:* Good prospect. *Emmett:* Increased acreage. *Van Buren:* Look well.

WISCONSIN.—*Walworth:* Acreage increasing. Look splendidly; never better. *Saint Croix:* Remarkably fine. *Calumet:* Increased acreage. *Sheboygan:* Look well.

MINNESOTA.—*Meeker:* Look well. *Waterman:* Promise an extra crop. *Freeborn:* Look sickly.

IOWA.—*Cedar:* Growing finely. *Jackson:* Fair. *Hardin:* Look fine. *Johnson:* Better than usual. *Muscatine:* Never better.

MISSOURI.—*Platte:* Grub seriously injuring the oats. *Harrison:* Look well. *Buchanan:* Prospect never better. *Moniteau:* Unusually promising. *Daviess:* Not over half the crop sown yet. *Montgomery:* Chinch-bug has appeared among the oats, but has, as yet, done but little damage. *Carroll:* Chinch-bug depredating on oats. *Jasper:* Never more promising. *Franklin:* Large promise. *Dallas:* Chinch-bug threatens the crop. *Marion:* Look well.

KANSAS.—*Cherokee:* Favorable spring. *Leavenworth:* Chinch-bug destructive. *Cloud:* Crop heavy.

INDIAN TERRITORY.—*Cherokee Nation:* Slowly recovering from the storm of May 17.

DAKOTA.—*Bonhomme:* Look remarkably well; ground in fine condition.

RYE.

The acreage of winter-rye is reported above average in the following States, viz: Massachusetts, 102; Florida, 122; Texas, 105; Arkansas, 109; Tennessee, 101; Kentucky, 102; Nebraska, 117; California, 115. It is full average in Connecticut, New Jersey, South Carolina, Wisconsin, and Kansas. In the remaining States the acreage is below average, ranging from 88 in Rhode Island to 99 in Maine and Iowa. In condi-

tion of the crop the following States are average or above, viz: Alabama, 113; Georgia, 109; California and Texas, 108; Tennessee and Kentucky, 105; Arkansas, 102; Vermont, North Carolina, and Minnesota, 100. The remaining States are below average, ranging from 55 in Delaware to 99 in Wisconsin.

VERMONT.—*Orange:* Winter-rye looks well.

MASSACHUSETTS.—*Suffolk:* Suffered severely. *Norfolk:* Somewhat winter-killed but looks well.

CONNECTICUT.—*New London:* Injured by severe winter.

NEW YORK.—*Albany:* Winter-killed and spotted; not over 60 per cent. of a crop. *Jefferson:* Acreage small; looks well.

NEW JERSEY.—*Mercer:* Hardly more than half a crop.

PENNSYLVANIA.—*Lancaster:* As good as ever; straw long and prospects of a large crop flattering. *Montgomery:* Badly winter-killed. *Indiana:* Poor prospect. *Northumberland:* Winter-killed.

VIRGINIA.—*Culpeper:* Scottish seed from the Department, 10 per cent. above average. *Henrico:* Injured by drought. *Craig:* Below average. *Surrey:* Acreage increased 10 per cent.; prospect poor. *King and Queen:* Bad condition. *Bath:* Looks badly.

NORTH CAROLINA.—*Jackson:* Scotch rye promises more grain and less straw than common rye. *Moore:* Rye looks well. *Henderson:* Acreage reduced.

GEORGIA.—*Marion:* Good Scotch rye improved; 3 feet high; lower than native rye.

TEXAS.—*Upshur:* Acreage increased; condition improved. *McLennan:* Will average 25 or 30 bushels per acre.

ARKANSAS.—Scotch rye did not germinate.

TENNESSEE.—*Rhea:* Promising a good crop. *Roane:* Seed from Department very promising.

KENTUCKY.—*Grant:* Largely winter-killed. *Laurel:* More promising than for many years.

WEST VIRGINIA.—*Hardy:* Not over half a crop.

OHIO.—*Scioto:* Acreage reduced 20 per cent.; condition improved 15 per cent., owing to good weather. *Crawford:* Early drilled looks well.

ILLINOIS.—*Cass;* Looks well. *Boone;* Acreage reduced on account of fall drought. *Lee:* Looks well. *Ogle:* Looked poorly in early spring, but has improved.

IOWA.—*Muscatine:* Injured by winter drought.

MINNESOTA.—*Dakota:* Complete failure. *Sherburne:* Badly winter-killed.

BARLEY.

In New England no winter barley is reported. In New York the acreage is 90, and the condition 80. Pennsylvania is 2 per cent. above average in area, and 25 per cent. below in condition. Maryland, with an acreage indicated by 103, reports a condition of only 55. North Carolina is 5 per cent. above average in area and 1 per cent. below in condition. South Carolina is average in both, and Georgia nearly so—99. Alabama, with a reduction of 3 per cent., acreage reports an improved condition of 113. Texas has cut down her area 17 per cent., but the condition is 25 per cent. above average. The figures of Tennessee are 93 and 107 respectively. Kentucky is full average in condition, but 10 per cent. below in area. Of the States north of the Ohio all are below average in condition, ranging from 69 in Ohio to 99 in Wisconsin. Michigan, Illinois, and Wisconsin are average or above in area. West of the Mississippi, Iowa and Kansas present an increased acreage, Iowa 2 per cent. above, Missouri being 80 and Kansas 96. On the Pacific coast, California has increased her area 22 per cent., the condition of the crop being 2 per cent. below average. Oregon is 17 per cent. below average in condition, and 16 per cent. below in area.

Spring barley, in condition, is full average or above in all of the New England States except Massachusetts, where it is 2 per cent. below, the acreage being about average on the whole. In New York and Pennsylvania the acreage is 5 per cent. and the condition from 9 to 12 per cent. below average. In the Northwestern and Pacific States the condition is mostly average or above, ranging from 95 in Ohio to 113 in California. The acreage ranges from 92 in Ohio to 124 in Oregon.

VERMONT.—*Orleans:* Not all sown yet; what was put in from May 1 to 10 looks well.

NEW YORK.—*Livingston:* Some in good order and season. *Genesee:* Unpromising; needs rain. *Wyoming:* Small.

ALABAMA.—*Lawrence:* Unusually promising.

TEXAS.—*McLennan:* Will average 50 bushels per acre.

OHIO.—*Sciota:* Acreage above average. *Warren:* Suffering terribly; spring barley abandoned. *Fairfield:* Badly frozen out. *Crawford:* Early-drilled barley looking well. *Lorain:* Crops never better. *Champaign:* A total failure.

INDIANA.—*Posey:* Harvest two weeks late; army-worm injurious, but the prospect better than last year. *Stark:* Spring barley from the Department very fine.

ILLINOIS.—*Monroe:* Half winter-killed. *Ogle:* Late, but promising. *La Salle:* Spring crops looks well.

IOWA.—*Muscatine:* Never looked better. *Johnson:* Good.

MINNESOTA.—*Meeker:* Looks well. *Waterman:* Doing finely. *Blue Earth:* Slight decrease in acreage. *Freeborn:* Cold, wet weather makes the crops sickly.

UTAH.—*Tooele:* Spring crop short in the straw; farmers discouraged in the culture.

CALIFORNIA.—*Placer:* Considerably drowned out by excessive rains. *Sonoma:* Crop will be but 50 or 60 per cent. on an average; injured by heavy rains in the early part of the season and by subsequent droughts.

GRASS AND PASTURES.

MAINE.—*York:* Grass in both fields and pastures thin and poor. *Aroostook:* Grass-wintered well, and promises a good crop. *Sagadahoc:* Grass growing nicely. *Androscoggin:* Clover almost a failure owing to dry season; pastures fair. *Cumberland:* Considerably winter-killed, but where there is a stand it looks well. *Waldo:* Good prospect for hay. *Somerset:* Grass-fields look poor. *Oxford:* Very favorable winter and spring for hay and pastures. A large crop hardly possible after the drought of last summer, but the prospect very good. *Piscataquis:* Pastures looking much better than for several years; clover has been so much winter-killed that little is now sown.

NEW HAMPSHIRE.—*Rockingham:* Grasses and pastures considerably winter-killed; oats, millet, and corn being sown for fodder. *Hillsborough:* Pastures afford but little food; hay selling at $40 per ton; latest season for many years; much grass winter-killed.

VERMONT.—*Orange:* Pastures look finely; fine rains have given feed two weeks earlier than last year. *Grand Isle:* Clover somewhat winter-killed. *Addison:* Pastures and meadows never better. *Caledonia:* Grass looks well. *Chittenden:* Grass and pastures never looked better. *Essex:* Last half of May especially favorable for grass.

MASSACHUSETTS.—*Worcester:* Pastures badly winter-killed. *Franklin:* Poor prospect for hay. *Plymouth:* Cold, dry winter injured grass crops severely, but late and frequent rains have greatly revived.

RHODE ISLAND.—*Washington:* Late rains have brought forward the grass to a full average.

CONNECTICUT.—*New London:* Grass looks very well. *Middlesex:* Late rains have started the grass very finely. Hay $40 per ton. *Hartford:* Grass crops injured by early spring drought.

NEW YORK.—*Tioga:* Grasses materially injured by drought. *Albany:* Meadows, especially old ones, look slim. *Jefferson:* Pasture two weeks late. *Livingston:* Clover wintered well. *Yates:* Drought seriously affecting meadows and pastures. *Lawrence:* Grass unpromising; hay crop light. *Franklin:* Grass backward. *Wyoming:* Clover winter-killed in some places; pastures short. *Otsego:* Meadows and pastures look fine. *Rensselaer:* Pasture short, but beginning to grow. *Ontario:* Grass backward. *Seneca:* Grass will be light and thin on the ground. *Washington:* Clover and pasture growing finely, but thin.

NEW JERSEY.—*Camden:* Clover and pasture very short. *Cumberland:* Clover improved by late rains, but pasture short. *Morris:* Pasture short except on low lands. *Mercer:* Clover, especially, shortened by drought. *Hudson:* Hay light; pastures short.

PENNSYLVANIA.—*Susquehanna:* Grass improving rapidly; grasshoppers dying out. *Lancaster:* Clover will not make over a half crop; pasture running very short. *Montgomery:* Clover injured by drought; spring pastures ten days late; recent rains have done good. *York:* Clover-stalks short, but well set. *Centre:* Grass not progressing. *Chester:* Spring pastures short. *Northumberland:* Grass badly frozen out in the winter, yet a large proportion survived and is again taking root. *Union:* Grass crops greatly improved by late rains. *Delaware:* Clover almost a failure. Timothy may yet come out. Less hay left over than for many years. *Lawrence:* Grass but a half crop.

DELAWARE.—*New Castle:* Hay severely affected by drought. *Sussex:* Pastures injured by drought and frosts.

MARYLAND.—*Frederick:* Grass crop almost a total failure; pastures shorter than ever known. *Howard:* Early drought left but little clover or pasture, even on good rich land; blooming but six inches high. *Cecil:* Hay crop short. *Kent;* Dried up.

VIRGINIA.—*Roanoke:* Grass crop considerably injured by early drought, but since improved by rains. *Spottsylvania:* Hay crop will be short. *Henrico:* Grass will not make over a half crop. *Stratford:* Clover severely affected by drought. *Craig:* Grass below average. *Surrey:* Clover and pasture 25 per cent. inferior. *Fluvanna:* Rain has greatly benefited the clover, but it will be short. *Orange:* Clover and other grasses wretched. *Madison:* The grass crop, except on moist low land, is almost an entire failure. *Rappahannock:* Meadows almost worthless. *Prince George:* Grass crop suffered from drought. *Bath:* Grass crop very short; without more rain there will not be a half crop of hay. *Amherst:* Grass crop shortened by drought. *Nelson:* Grass crop exceedingly short. *Augusta:* Clover heading out near the ground; meadows short and burnt out. *Gloucester:* Grass and spring pasture below average, while the exhaustion of winter provender made early grazing necessary. *Clark:* Clover and pastures short. *Prince William:* Grass suffering from lack of rain. *Wise:* Clover and pastures much injured by severe drought.

NORTH CAROLINA.—*Stokes:* Meadows recovered from drought by late rains; nearly up to average. *Surrey:* Clover and pastures much injured. *Gaston:* Clover culture increasing; crop looks well. *Moore:* Clover culture increasing. *Alamance:* Grass crop not good. *Haywood:* Pastures injured by drought. *Montgomery:* Clover and pastures damaged by drought.

SOUTH CAROLINA.—*Union:* Very little clover grown. *Georgetown:* Savannah grasses quite luxuriant. *York:* Clover growing in favor; can be profitably grown; drought has shortened the crop. *Anderson:* Pastures suffering from drought.

GEORGIA.—*Walton:* Clover promising; acreage increased. *Harris:* Red clover did well till the May drought. *Newton:* Growing interest in grass crops; clover acreage increased 300 per cent. *Hancock:* Clover culture increasing. *Wilkes:* Clover cultivation increasing; some lots grow three or four feet high. *Jackson:* Clover increasing for several years. *Marion:* The only clover-field in the county looks well. *Troup:* Clover looks well. *Fulton:* Great interest in clover; crop fine. *Butts:* Clover looks well; culture just commenced.

ALABAMA.—*Crenshaw:* Drought killing Alsike clover. *Lee:* Red clover successfully introduced. *Cherokee:* Recent heavy rains have improved the grass crops.

MISSISSIPPI.—*Wayne:* Grass in fine condition. *Rankin:* Rye for pasture looks well. *Smith:* Small experimental growth of clover.

TEXAS.—*Lavacca:* Spring pastures good. *Fayette:* No clover except Lucern will grow here, and that is not relished by live stock. *Gonzales:* California clover the only successful variety; acreage increased. *Johnson:* A small experimental growth of red clover and timothy doing well.

ARKANSAS.—*Columbia:* Wild grass better than usual.

TENNESSEE.—*Rhea:* Clover injured by drought, but improved by late rains. *Dickson:* Increased area of clover and grasses, indicating a new era of farming prosperity; clover has already diminished hog diseases. *Granger:* Hay will be 25 per cent. short, but quality better than when the yield is great. *Robertson:* Pastures and meadows shortened by drought. *Dickson:* Increased acreage of clover and grasses very advantageous to the farmers. *Monroe:* Meadows and clover shortened by drought. *Loudon:* Increased attention paid to grasses. *Greene:* The Italian and perennial rye-grasses promise to be an important acquisition—seed nearly ready to ripen. *Putnam:* Pastures and young clover very poor, owing to a flood and drought in April. *Sevier:* Clover and pasture short from severe drought. *Coffee:* Clover and hay crops considerably shortened by drought. *Obion:* Pasture very fine.

KENTUCKY.—*Nicholas:* Clover not so good as usual on account of drought and cool weather; spring pastures shorter than usual. *Laurel:* Clover has largely died out; spring pasture luxuriant. *Russel:* Drought killed young clover and grass generally; exhaustion of winter food caused the cattle to be turned on the grass fifteen or twenty days earlier than usual, depriving it of all chance of growth.

WEST VIRGINIA.—*Preston:* Grasses injured by drought. *Jefferson:* Clover badly winter-killed; hay will be scarce. *Cobell:* Grass greatly improved. *Nicholas:* Grass very short and backward.

OHIO.—*Sciota:* Fine prospect for clover; spring pastures good. *Warren:* Clover badly frosted. *Hancock:* Cut-worms hard on clover. *Pickaway:* Hay will be short; pastures need rain. *Lorain:* Pastures never better. *Adams:* Cut-worms have destroyed three-fourths of the clover.

INDIANA.—*Grant:* Cut-worms injuring the clover; crop will be short. *Elkhart:* Grass looks well. *Madison:* Cut-worms hard on grass. *Gibson:* Army worms in the meadows. *Perry:* Meadows look well. *Kosciusko:* Pastures unusually good; frost May 3 injured clover. *Putnam:* Cut-worms have nearly eaten up whole fields of clover. *Spencer:* Army worm destructive on meadows; hogs feed on them freely. *Boone:* Grass crops fine except a few fields injured by cut-worms, which have especially destroyed

the clover. *Washington:* Grass crops good. *Morgan:* Spring pasture never better. *Hamilton:* The old crop does not look well, but young clover very fine. *Hancock:* Good season for grass; some meadows destroyed by black cut-worms. *Wells:* Most of the clover over one year old destroyed by cut-worms.

ILLINOIS.—*Edgar*: Grass promising. *Cass:* Clover of former years nearly all winter-killed, but this spring's sowing is doing finely. Spring pasture, blue grass, and timothy never were better. *Pike:* Many fields of clover winter-killed; scarcely one has a good stand. *Logan:* Clover greatly damaged by winter cold. *Lee:* Pasturage looking finely. *Monroe:* Army worm destructive on timothy. *Boone:* Clover badly winter-killed. *Clarke:* Clover injured by drought. *Knox:* Clover on wet ground badly winter-killed.

MICHIGAN.—*Wayne:* Copious rains have improved the grass. *La Pierre:* Nearly all of last fall's sowing of clover ruined by drought. *Calhoun:* Drought retarded grass. *Van Buren:* Grass promising largely. *Montcalm:* Old clover fields badly winter-killed. *Shiawassee:* Grass crops improving. *Livingston:* Last year's sowing of clover lost.

WISCONSIN.—*Jumeau:* Grass promises an abundant crop. *Pierce:* Many fields of clover damaged by freezing where the crop was taken off last fall for seed. *Portage:* Spring favorable to grass. *Saint Croix:* Grass looking remarkably well. *Adams:* Clover acreage greater than ever before, the soil having developed a superior adaptation to that crop. *Calumet:* Quite a percentage of the land heretofore devoted to cereal growth has been laid down in meadow and pasture.

MISSOURI.—*Greene:* Hay crop will be large. Some meadows, seeded down for twenty-five or thirty years, will yield three tons per acre, a good admixture of clover remaining with the timothy. *Harrison:* Grass looks well. *Moniteau:* Meadows look unusually well. *Cole:* Hay crop very promising. *Pike:* Old clover largely killed; that sown this spring is doing well. *Carroll:* Clover generally winter-killed. *Callaway:* Clover and timothy sown this spring look very well.

IOWA.—Clinton grass looks very well. *Cedar:* Grasses growing finely. *Louisa:* Army worm injuring the meadows. *Guthrie:* Light rains have finely brought out grass crops. *Howard:* Clover badly winter-killed. *Muscatine:* Clover and pasture fine. *Floyd:* Clover badly winter-killed, especially last year's sowing. *Chickasaw:* Grass looks well. *Henry:* Timothy injured by worms resembling the cut-worm. Their work appears to be done, and they are dying. Hogs eat them greedily.

MINNESOTA.—*Meeker:* Spring pastures excellent since May 10. *Goodhue:* Large increase of clover. *Houston:* Grass promising.

KANSAS.—*Morris:* Pasture full average. *Cloud:* Clover first sown this year. *Republic:* A few experimental patches of clover.

NEW MEXICO.—*Doña Aña:* No clover except alfalfa, which is cut from four to six times from May to November, being used exclusively for green feed. The native grass —*grama*—may be cut the year round.

CALIFORNIA.—*Contra Costa:* The hay crops will be of poor quality, except that made from seeded-grain. Pasturage abundant, but the wild oats and clover are trenched on more and more by noxious weeds. *Placer:* Pasturage, though later than usual, is a full average and will last longer than for two years past, on account of the great amount of moisture left in the ground by the heavy rains. *Sonoma:* Hay and grass crops light; feed will soon be scarce on stock ranges. *Sacramento:* Clover-fields have been killed out by excess of rain. *Tuolumne:* Hay-crops will be light. *Alameda:* Hay a fair crop. *Nevada:* Much hay made in the southern part of the county by mowing oats and other grain. *San Joaquin:* Large crops of grass and hay.

OREGON.—*Umatilla:* Native grasses drying up. *Josephine:* Grasses short. *Douglass:* Alfalfa promises to be a good crop.

FRUIT.

Apples.—The apple crop of New England gives very fair promise. Reports from the different counties indicate an amount of bloom 28 per cent. above average, and an improvement in condition and prospects of nearly 17 per cent. above average. Every county reports a full average condition except Hartford County, Connecticut, where the canker-worm has reduced the average 20 per cent. This is the only county in New England from which any reports of insect depredations have been received. In Kent County, Rhode Island, a severe north-eastern storm denuded the trees of a large proportion of their blossoms, yet the general crop prospect is estimated at 50 per cent. above average. Norfolk County, Massachusetts, reports a very remarkable increase of bloom—200 per cent.—and an improvement of 50 per cent. in the con-

dition of the crop. These gratifying results are attributed to extra care in the destruction of the canker-worm.

The Middle States report a general increase in blooms of 17 per cent. above average and in condition of 9 per cent. In New York the apple-bloom is 16 per cent. and the general condition of the crop 9 per cent. above par. Apple-growers appear to be quite cheerful, except in Kings County, where it is said that apples have been deteriorating for several years. In New Jersey the apple-bloom was 21 per cent. and the condition of the crop 15 per cent. above average. In some counties the crop indicates great improvement, both in quantity and quality, results attributed to the destruction of insects by the extreme cold of last winter. In Pennsylvania bloom and condition of the crop, respectively, are 10 and 8 per cent. above average, every county except three reporting a full average. In Berks County the drought has caused much of the bloom to fall fruitless. Delaware reports an increase of 35 per cent. in bloom and of 16 per cent. in the condition of the crop.

In passing into the Southern Atlantic States, the averages of the fruit-crop begin to decline. In Maryland, while the bloom is 10 per cent. above average, the condition of the crop is 7 per cent. below. Drought, cold, and insects are reported in several localities as very injurious. In Virginia the crop is average in condition and 12 per cent. above in bloom. The ravages of frost during the blooming season are mentioned in different parts of the State. In Amherst County an unnamed insect is reported as killing both fruit and twigs. In several counties the fruit has fallen immaturely from the trees. In North Carolina the condition of the crop was 5 per cent. and the bloom 14 per cent. above average. No injuries from weather or insects are mentioned. South Carolina exhibits a decline of 4 per cent. in bloom and of 15 per cent. in the condition of the crop. In Lexington County the ends of the tree-limbs are dying, either from the ravages of some insect or from blight. In Georgia the bloom was 9 per cent. and the condition 5 per cent. below average. In some quarters the adverse influence of storms and wind is alleged, and in others cold and drought, to account for the decline.

In all the Gulf States the apple crop is below average, both in bloom and condition, the decline, in Florida, amounting to 20 per cent. In Arkansas the crop is considerably reduced in condition by caterpillars, which, in some places, have stripped the leaves from the fruit-trees. The weather, however, is generally reported as propitious to fruit-culture. Tennessee reports an improvement of 9 per cent., both in bloom and condition, though the curculio and caterpillar have commenced their ravages. In Grainger County the curculio is becoming more destructive each year. In Kentucky the apple crop is still more promising, the bloom being 13 per cent. and the condition of the crop 16 per cent. above average. The injuries from frosts are serious in some places, but more than compensated by extraordinary fullness at other points. Complaints of locust depredations have been received in one or two cases, but no other insect enemies are noted. In West Virginia, in several counties, fair prospects of the apple crop have been blighted by heavy frosts. The condition of the crop is 8 per cent. below average, though the bloom was fuller than usual.

Of the States north of the Ohio River, the crop is below average in Ohio and Indiana. From several points in these States come serious complaints of insect injuries and frosts. Our correspondent in Johnson County, Indiana, reports the caterpillars unusually destructive on

orchards; his own, however, had escaped, through his special care in protecting the birds. Illinois reports a large increase of bloom, but cut down by frost to an average. The curculio and caterpillar are reported as mischievous at a few points. In Michigan and Wisconsin crop prospects are full average, though retarded by lateness of the season. The severity of the winter seems to have had the good effect of destroying insects, none having been reported.

West of Mississippi River, the apple bloom was very full, and the condition of the crop is excellent, Kansas, especially, reporting an improvement of 21 per cent. The apple crop is safe in Doña Aña County, New Mexico, but was deficient in bloom in Beaver County, Utah. On the Pacific coast, the condition of the crop was depreciated 10 per cent. in California, and 21 per cent. in Oregon, by cold and frost, assisted in one county by caterpillars.

Peaches.—At the date of our report the peach had only begun to bloom in the northern New England States, yet in several counties a full average condition was observed, and in one instance an improvement of 10 per cent. Massachusetts reports one county in which the bloom was but one-tenth and the condition of the crop three-tenths of an average. All the other counties reported, however, show a full average with a very considerable improvement. Rhode Island declines about two-tenths in bloom and in condition of the peach crop, while Connecticut reports an improvement of 21 per cent. in the former and 13 per cent. in the latter.

The peach crop of the Middle States is slightly below average, both in bloom and condition, Delaware showing a decline of 34 per cent. of the former and 42 of the latter. In none of these States is there any mention of insect depredations, the extreme cold of last winter having been fatal to those pests.

In the Southern Atlantic States the crop appears to be nearly an average, the only serious decline being in Maryland, where the condition of the crop is 11 per cent. below average. In this State the drought has brought out the curculio, and the caterpillar is also active in some localities. In some parts of Virginia late and heavy frosts have either partially or wholly swept the crop, but in other localities it is full and promising. In North Carolina peaches are above average both in bloom and condition. In South Carolina, while the general condition of the crop is somewhat above average, the fruit is reported in some instances as falling from the trees. In Georgia, while the serious effects of cold and drought are acknowledged in some quarters, the especial improvement in others brings the crop to nearly a full average. The peach is below average in condition in all of the Gulf States except Texas. The curculio is reported in Louisiana, but the general complaint is of unfavorable weather. In Texas several counties report the crop as superior in quality though deficient in quantity. In Arkansas and Tennessee the season is generally reported favorable for peach-culture, both States reporting a very considerable improvement both in bloom and condition. Kentucky shows a decreased bloom but an improved condition. In some cases the crop was swept by late frosts. In West Virginia the crop is 28 per cent. below par, the fruit being largely winter-killed.

North of the Ohio the peach crop is very unpromising, except in Illinois, where the bloom is estimated at 17 per cent. and the condition of the crop 14 per cent. above average. Ohio reports but 35 per cent. of average bloom, and but 57 per cent. of average condition. In Indiana the figures under these heads, respectively, are 87 and 96. Michigan

reports serious loss to the peach crop from the severity of last winter, destroying not only the crop but also the trees. The bloom amounted to but 57 per cent. and the condition of the crop to 70 per cent. of an average. Our reports from Wisconsin and Minnesota make no mention of the crop whatever. The other States west of the Mississippi present very encouraging reports, ranging from 3 per cent. to 48 per cent. above average. But few casualties mar the cheering prospect. The Pacific States show a serious decline in the crop of California, being but 64 per cent., and in Oregon but 53 per cent., of an average condition.

Pears.—Reports from the pear crop of the New England States show an advance of 5 per cent. above average, both in bloom and in condition. New Hampshire and Rhode Island fall about 5 per cent. below par, the others being full average or above The pear crop of the Middle States is about average in condition and bloom. Fruit prospects are nearly an average in New York and New Jersey, and above average in Pennsylvania, while Delaware reports but 88 per cent. of an average condition of the crop. Pears in Maryland, Virginia, and North Carolina are nearly average in condition, with full amount of bloom, but in South Carolina and Georgia the decline ranges from 10 to 20 per cent. in both. In the Gulf States the crop is considerably below average, though quite favorable in isolated localities. In Fayette and Gonzales Counties, Texas, pear culture is reported as remarkably successful. In Arkansas the crop was injured in some counties by insects, and its general condition is 4 per cent. below par, while in Tennessee it is a full average, and in Kentucky from 8 to 11 per cent. above. In West Virginia the crop declines 14 per cent. North of the Ohio River it ranges 91 to 101. West of the Mississippi the condition of the crop is considerably below the bloom, as also on the Pacific Coast.

Small fruits.—In Camden County, New Jersey, the strawberry-vines were nearly burned out by drought. In Jefferson County, New York, they suffered severely during the winter from extreme cold. Raspberries were injured by the cold weather in Northumberland County, Pennsylvania. In Henrico County, Virginia, strawberries will not make a half crop. Strawberries and blackberries were shortened by drought in Jefferson County, Louisiana. Small fruits killed in Thurston County, Washington Territory.

Oranges.—In Levy County, Florida, the young oranges are fast falling from the trees.

Grapes.—Grape vines were badly winter-killed in Alleghany County, New York, and in Northumberland County, Pennsylvania. In the latter county the varieties that best withstood the severity of the weather were the Concord, Clinton, and Telegraph. In Alexandria County, Virginia, the drought seems to have been especially favorable to grape culture, which is more promising than at any previous time.

Plums.—In Alleghany County, New York, plum-trees bloomed full, but in Jefferson County the trees suffered greatly from the severity of the winter. Plums were also injured by the weather in Clearfield County, Pennsylvania.

Table showing the condition of the crops, &c., on the 1st day of June, 1872.

States.	WINTER-WHEAT.		WINTER-RYE.		WINTER-BARLEY.		SPRING-WHEAT.		SPRING-BARLEY.		OATS.	
	Acreage compared with last year.	Average condition June 1st.	Acreage compared with last year.	Average condition June 1st.	Acreage compared with last year.	Average condition June 1st.	Acreage sown this spring compared with last.	Average condition June 1st.	Acreage sown this spring compared with last.	Average condition June 1st.	Acreage compared with last year.	Average condition June 1st.
Maine	102	101	99	98	.....	.....	108	101	100	103	105	102
New Hampshire	97	96	93	96	.....	.....	100	99	102	100	103	99
Vermont	99	105	93	100	.....	.....	102	106	102	101	112	106
Massachusetts	97	91	102	88	.....	.....	95	99	93	98	98	100
Rhode Island	.....	.....	88	88	.....	.....	.....	.....	95	101	86	104
Connecticut	95	88	100	85	.....	.....	98	98	100	100	98	95
New York	98	68	95	84	90	80	97	91	95	91	100	93
New Jersey	98	70	100	80	.....	.....	.....	.....	.....	.....	97	90
Pennsylvania	90	70	95	76	102	75	100	90	95	88	100	90
Delaware	96	70	90	55	.....	.....	.....	.....	.....	.....	100	66
Maryland	100	44	92	68	103	55	.....	.....	.....	.....	98	70
Virginia	98	85	93	83	.....	.....	.....	.....	.....	.....	98	72
North Carolina	101	101	97	100	105	99	.....	.....	.....	.....	99	90
South Carolina	96	97	100	93	100	100	.....	.....	.....	.....	102	87
Georgia	98	105	97	109	99	99	.....	.....	.....	.....	103	92
Florida	.....	.....	122	97	.....	.....	.....	.....	.....	.....	104	87
Alabama	105	115	97	113	97	113	.....	.....	.....	.....	110	82
Mississippi	95	104	96	96	.....	.....	.....	.....	.....	.....	110	89
Louisiana	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	110	101
Texas	115	117	105	108	83	125	.....	.....	.....	.....	112	110
Arkansas	90	110	109	102	.....	.....	.....	.....	.....	.....	110	108
Tennessee	103	117	101	105	93	107	.....	.....	.....	.....	102	93
West Virginia	100	85	97	88	.....	.....	.....	.....	.....	.....	102	86
Kentucky	92	108	102	105	90	100	.....	.....	.....	.....	95	99
Ohio	88	78	92	82	88	69	98	93	92	95	97	94
Michigan	92	75	96	93	112	98	110	98	94	98	107	100
Indiana	94	85	91	91	96	85	91	104	96	104	105	103
Illinois	101	80	94	95	100	86	75	103	84	100	105	106
Wisconsin	103	101	100	99	100	99	98	104	95	101	103	103
Minnesota	76	69	97	100	.....	.....	101	106	95	105	106	108
Iowa	102	80	99	93	106	102	106	111	107	107	107	108
Missouri	92	58	95	81	96	80	108	95	109	104	109	110
Kansas	62	46	100	83	105	96	140	108	120	104	135	110
Nebraska	125	50	117	98	.....	.....	113	114	107	113	114	115
California	130	99	115	108	122	98	120	96	102	98	99	98
Oregon	110	90	96	93	84	83	107	95	124	96	107	97

Table showing the condition of the crops, &c.—Continued.

States.	CLOVER.		SPRING PASTURE.	MAPLE SUGAR AND MOLASSES.		COWS.	COTTON.		APPLES.		PEACHES.		PEARS.	
	Acreage compared with last year.	Average condition June 1st.	Average condition June 1st.	Product of sugar this year compared with last.	Product of molasses this year compared with last.	Average condition of cows this spring.	Acreage compared with last year.	Average condition June 1st.	Average am't of bloom this spring.	Average condition of the crop June 1.	Average am't of bloom this spring.	Average condition of the crop June 1.	Average am't of bloom this spring.	Average condition of the crop June 1.
Maine	105	102	102	75	77	94	.....	.....	114	102	.....	.....	106	103
New Hampshire	101	89	91	53	53	95	.....	.....	125	115	.....	110	96	95
Vermont	104	110	106	67	71	89	.....	.....	105	127	100	.....	102	105
Massachusetts	100	85	86	62	57	93	.....	.....	125	105	110	.....	.....	.....
Rhode Island	90	101	96	.....	.....	91	.....	.....	123	120	78	80	95	95
Connecticut	97	92	91	.....	.....	89	.....	.....	132	123	121	113	128	126
New York	98	90	87	70	67	95	.....	.....	116	109	97	93	94	102
New Jersey	100	62	67	.....	.....	97	.....	.....	121	115	105	97	102	98
Pennsylvania	94	76	76	72	74	89	.....	.....	110	108	95	94	102	100
Delaware	100	86	73	.....	.....	86	.....	.....	135	116	66	58	100	88
Maryland	100	56	52	.....	.....	86	.....	.....	110	93	96	89	103	94
Virginia	98	77	77	114	114	89	104	95	112	100	104	97	106	98
North Carolina	111	94	90	.....	.....	87	116	96	114	105	106	104	100	98
South Carolina	157	113	76	.....	.....	87	109	92	96	85	98	103	83	80
Georgia	145	102	97	.....	.....	91	112	96	91	95	100	96	90	85
Florida	.....	.....	100	.....	.....	86	110	95	100	80	98	88	.....	.....
Alabama	128	96	95	.....	.....	98	111	105	94	93	99	89	92	90
Mississippi	125	110	97	.....	.....	92	110	100	99	98	99	98	96	85
Louisiana	.....	.....	97	.....	.....	94	111	104	92	95	95	88	88	69
Texas	150	100	96	.....	.....	99	118	100	96	102	106	101	95	95
Arkansas	109	101	100	.....	.....	106	116	98	100	93	108	105	90	96
Tennessee	104	89	92	132	103	95	112	101	109	109	100	112	99	100
West Virginia	95	87	84	112	106	94	.....	.....	107	92	73	72	87	86
Kentucky	105	102	102	111	105	97	101	105	113	116	92	108	111	108
Ohio	99	93	92	76	77	99	.....	.....	101	97	35	57	99	91
Michigan	93	84	95	77	78	94	.....	.....	113	104	57	70	93	96
Indiana	97	97	100	91	90	99	.....	.....	100	94	87	96	103	95
Illinois	102	98	107	90	92	102	.....	.....	109	103	117	114	103	101
Wisconsin	108	103	105	77	72	97	.....	.....	101	102	.....	.....	93	93
Minnesota	114	99	103	100	97	99	.....	.....	117	106	.....	.....	.....	.....
Iowa	107	105	107	62	64	104	.....	.....	127	109	105	103	106	97
Missouri	108	109	110	100	103	101	110	97	117	109	140	130	108	105
Kansas	118	100	106	.....	.....	94	.....	.....	146	121	148	131	115	99
Nebraska	.....	.....	114	.....	.....	90	.....	.....	138	101	133	106	128	88
California	108	102	114	.....	.....	103	.....	.....	99	90	84	64	96	87
Oregon	102	101	101	.....	.....	97	.....	.....	126	79	82	53	134	70

AGRICULTURE IN CALIFORNIA.

The biennial report of the California State Agricultural Society for 1870–'71 has been received. A digest of its more important points may be of interest. According to estimates based on the returns of the county assessors, the value of the agricultural products of California for 1870, not including fruits, amounted, in round numbers, to $60,000,000, obtained from 2,596,612 acres under cultivation, averaging $23.10 per acre.

It is believed that in 1871, in consequence of the extreme drought, the product was somewhat smaller than in 1870, although the enhancement of prices went far toward compensating producers for deficiency in quantity. The wool-growers enjoyed especial prosperity, the yield of 1871 being about 25,000,000 pounds, returning 27½ cents per pound, against 19,472,660 pounds in 1870, returning 19 cents; showing an increase of over 82 per cent. in the value of the clip.

Of 80,000,000 acres of tillable land in California, less than 3,000,000 are under cultivation, the area thus utilized in 1870 being, by the assessor's returns, 2,596,612 acres. Of the total population of the State—namely, 560,223—nearly one-half, or 249,738, are residents of twenty-four of the larger cities and towns, leaving 310,485 for residents of the smaller towns, occupants of farms, &c. Census statements show 23,375 farms under cultivation in 1870, the products of which, not including fruit, averaged in value $2,567. This exhibit shows a small rural population and a vast amount of fertile land yet unoccupied for cultivation, and suggests the inquiry whether the prosperity of a region peculiarly rich in natural resources is not impeded by land monopolies.

Statistics collected by the State board of equalization show that in eleven counties 5,465,286 acres (more than double the whole amount cultivated in the State in 1870) are in the hands of one hundred owners, either individuals or companies, averaging nearly 54,653 acres to each proprietor. These lands, which, on an average, cost their owners $1 to $1.25 per acre, are chiefly held for sale in lots to suit purchasers, at prices ranging from $2 to $8 per acre. They are now assessed at an average value of $2 per acre, but were they divided into farms, and occupied as such, their average value would be increased at least $10 per acre, and this alone would add $54,652,860 to the taxable wealth of the State. Divided into farms averaging 160 acres, occupied by families averaging five persons, and yielding products of the same average value with those under cultivation in 1870, the result would be an addition of 170,790 to the rural population of the State, and of $126,000,000 to the value of its farm products.

This ownership by companies of large tracts held for sale at an advance on Government prices exists to some extent in all the counties in the State. The Central Pacific Railroad also holds within the State in the same way 3,000,000 acres. This transfer of vast tracts of unimproved land from the Government into the hands of private owners, who hold it for purposes of speculation, operates as a serious check upon immigration and upon the development of the State's resources.

Irrigation, floods, and swamp-lands.—An experience of twenty years, in which many millions of money and a large amount of property have been sacrificed by the failure of isolated and oftentimes conflicting attempts to prevent the ravages of drought and of flood, and to reclaim swamp lands, has proved the necessity of adopting, by State legislation,

some general system which shall include the entire portion of the State lying between the Coast range and the Sierra Nevada Mountains, and unite in one plan the threefold design of irrigation, prevention of floods, and reclamation of swamp lands. It is thought that such a system must provide additional channels to conduct through the great valleys the vast quantities of water that fall on the widely extended watersheds sloping into them, and that these channels must have outlets at some distance from the natural one, through which all the waters of a flood must be discharged. It is represented that an area of not less than 5,000,000 acres within the contemplated limits of such a system is now, in some parts, so liable to frequent droughts and floods, and in others so swampy, that it is unfitted to support any more than a scanty and unthrifty population; but the soil is of such a quality that if the proposed system were carried into effect it might easily support in a condition of permanent agricultural prosperity one person to every acre; that is, a population of 5,000,000.

Wood and timber.—According to careful estimates, which are deemed reliable, one-third of the wood and timber existing in California twenty-two years ago has been consumed. The requirements of the State for forest products will be, at least, ten times as great for the next twenty-two years. To dispense with the use of timber for fencing is to so far prevent the destruction of forests, and since the costliness of fencing material is now a serious drawback to the agricultural interests of the State, the subject of fence laws demands the immediate consideration of the legislature. At the same time no more important subject can occupy its attention than that of forest-culture. The most enterprising of the European states began, long since, to encourage by legislation the planting of forests. As the result, England and Scotland now have thousands of acres of majestic pines, beeches, and oaks; Germany has in government forests large groves of California redwood, with other valuable timber trees, collected from different parts of the world, and in France, Austria, and Russia, planted forests are among the most valued of government possessions. The scarcity of hard-wood timber in the State retards its agricultural prosperity by restraining the manufacture and enhancing the price of agricultural machinery and vehicles. Experiments, made through the efforts of the State Agricultural Society, have proved the groundlessness of a prevalent impression that the climate is unfavorable to the growth of hard-wood timber. These experiments have been sufficiently protracted to demonstrate that the best varieties of hard wood, including different species of locust, walnut, butternut, chestnut, orange, mulberry, and maple, will grow in the State more thriftily than in the Atlantic States, without any depreciation in durability, elasticity, or strength. Furthermore, some of the best varieties of hard wood indigenous to Australia have been imported and tested, with like results.

Products outside the ordinary limits of agriculture.—The manufacture of castor-oil, it is claimed, is becoming in the State a remunerative business, and that there is no reason why it should not be largely produced for export, all parts of the State being well adapted to the growth of castor-beans. In 1871 over 700,000 pounds of them were produced in the State; in Yuba County alone 600,000 pounds. Their estimated value is 4 cents per pound.

The cultivation of chiccory, successfully carried on for several years in Yolo County by a German firm, is represented as growing into an important business. In 1871 that firm produced of it, in a cured state, 135 tons, valued at over $20,000. Other counties are beginning to en-

gage in the business, and, as chiccory thrives on all river-bottoms of a sandy loam, it can be extended indefinitely.

Mustard-seed, English and wild, is another product which is engaging attention and promising to become an extensive source of profit. In 1871, of English, Monterey County produced 13,000 bushels, valued at over $20,000; while of wild, Santa Barbara County gathered over $40,000 worth, and other parts of the State enough to bring the value up to $60,000.

A successful beginning has been made in growing broom-corn. In 1870 the value of the crop, produced principally in Yuba, Sutter, and Amador Counties, was over $40,000.

The report further represents that encouraging experiments have been made in the State in the growing of tea, coffee, rice, New Zealand and common flax, tobacco, and opium. In regard to the two latter, it has been proved that certain California soils equal the best Virginia tobacco lands, and samples of opium grown in the State have been pronounced by experts to be quite equal to the best imported article.

TENNESSEE.

The delightful climate, rich soil, and valuable undeveloped mineral resources of Tennessee are attracting the attention of enterprising farmers, manufacturers, and business men of the Northern States. Many of the more intelligent and thrifty emigrants from the Old World are also directing their steps thither. Professor Louis Basse, a German gentleman of some note as a writer on agricultural subjects, recently located in Stewart County, West Tennessee, from which point he writes relative to the agricultural resources and capabilities, and great mineral wealth of that locality. He has been a resident of this country for six years, has traveled extensively over six different States, and, after a residence of one year in Tennessee, gives it as his opinion that it is one of the most desirable locations he has yet found. The country is mountainous, and the surface generally undulating. There is a great difference of altitude, and consequently a great diversity of climate. The valleys are narrow and the streams rapid.

In the whole region of East Tennessee but few marshes can be found, and, save along the larger streams and rivers, there are no considerable bodies of bottom-lands. The rivers being fed principally by mountain springs are clear and cool, and filled with many excellent varieties of fish, including the speckled trout. The valleys are very productive and well adapted to the growth of the grasses, clover, wheat, corn, oats, barley, rye, tobacco, &c. As a tobacco-growing region it is favorably regarded; it is also well adapted to the growth of the grape, which is now being extensively cultivated. That portion of the State is composed of four distinct varieties of land: the valley, the bottom, the ridge, and the mountain lands. The ridge lands are valuable only for their timber, while the mountain lands contain great mineral wealth, yet undeveloped. Coal is found in great abundance, and marble deposits are inexhaustible. The price of land ranges from $5 to $100 per acre, river or bottom lands bringing the latter price. The winters are mild, and the summers cool and pleasant; the air is pure, dry, and healthy. A casual observer would conclude that in a latitude of 36° north the weather would be very hot in summer; but the latitude is offset by the altitude,

so that upon the mountains lying along the eastern and western borders there is no excessive heat even in midsummer.

Further *data* concerning this region are furnished by the following letter from the pen of Mr. J. C. McKinney, of Rogersville, Hawkins County, on the subject of its soil, climate, agricultural capabilities, and mineral resources:

East Tennessee has been called the Switzerland of America. It is truly a mountainous country, but interspersed with fine alluvial bottoms and rich valleys. It is bounded on each side by high mountains. It is some two hundred miles long by one hundred miles wide, extending from the northeast to the southwest, in which general direction all the streams and mountain ranges take their course. Although called a Southern State, its productions are those of the Middle States. All the grains, grasses, vegetables, and fruits of Pennsylvania grow and do well here. Years ago cotton was cultivated, but it was found that we could do better in raising horses and mules for the two cotton States south of us, and hogs and cattle to feed their people. This was the kind of farming followed by most of us before the war, and we did well at it. But the war stripped us of our stock. Grain brought good prices, and we all turned our attention to its cultivation; but the price has gone down, and the seasons have not been good, so that, in addition to running down our farms, we find ourselves, after the last most unpropitious season, with no surplus to sell and no money.

The country is very irregular and unequal. The river and creek bottoms are rich, and produce all kinds of grains and grass equal to the prairies of the West. There are fine bottoms that produce well, then more broken land, until you come to the mountains, which are fit only for pasture. There is one feature of the mountains and all our hills, which is, perhaps, peculiar—the southern side is generally thin land, while the northern is rich, producing good grain and grass to the very summit. We have fine timber of all kinds. The country is finely watered. We have good drinking-water, and water-power sufficient to drive any amount of machinery. Medicinal springs of all kinds exist, some of a very high character. It is entirely healthy; no section of the Western States is more so. Many persons from the North, afflicted with lung diseases, have found relief here. Owing to our altitude, our summers are no warmer than those of Pennsylvania. The winters are mild, there being but few days that out-door work may not be performed. This is a great advantage to the farmer, not only in the saving of fuel and the care of stock, but in many other respects.

Our farming, like the country, is unequal. Before the war there were many who followed a good rotation of crops, used improved implements, and their farms presented the appearance of careful cultivation. There were others, some owners of lands and some but renters, who cared nothing for improved machinery, whose farms presented a dilapidated and worn-out appearance. Since the war, unfortunately, the number of good farmers has decreased, while the class of renters, who care nothing for improvements, has largely increased. This class work the land on shares; they will neither manure the old nor clear up the new land. Our farms must be divided up and sold to men who will improve them, unless we can get a class of tenants like the English tenant farmer, who has some capital, and, renting a farm for a term of years, it becomes his interest to improve it.

The dairy business would do well here, as we have fine grass and good water, and long seasons for grazing. Some few who have tried it in a small way have done well. All kinds of stock do well, and our proximity to the cotton States gives us a good market for them. Our mountain-sides should be covered with sheep—there is no part of our country where they do better. A mixed husbandry is the kind for us—grain, grass, and stock. These will pay us best, and keep up the fertility of our lands.

CHANGE IN TEXAS CATTLE-RAISING.

Cattle-raisers are beginning to realize a change in the conditions which have hitherto secured to them certain special and anomalous advantages. A broad, free range of native grasses has relieved them of all care for the raising of food for their herds. The sole labor required hitherto has been in the collection and identification of each stock-raiser's cattle. The methods in use were effective enough when the business was in its infancy, but do not meet the necessities of its later

development. The increase of population and the opening of railroad communications with the northern and eastern markets have introduced conditions of production and transportation and of supply and demand which the old arrangements will no longer meet. In the coast regions—the theater of the earlier development of this industry—these changes are especially visible.

The great cattle range of Southwestern Texas is from the Nueces to the Rio Grande, (one hundred and fifty miles;) on the Colorado, fifty miles eastward, cattle change their range with the change of the weather, northers driving them to the timber belts for shelter, while sunshine allures them in immense masses to the open prairies. A correspondent of this Department saw 200,000 head gathered within a space of 20,000 acres of lowlands near the mouth of the Nueces River. These migratory tendencies of cattle render the task of collecting and identifying them one of great labor and difficulty, requiring the services of large numbers of men and horses. The employés of the cattle-raisers of a district organize hunting parties each spring and fall, in order to brand the calves. Each stock-owner is required by law to have a regular brand and ear-mark recorded in the office of the county clerk. In the semi-annual hunts each calf is branded with the brand of the cow it follows or sucks. A calf not found accompanying any cow is liable to be appropriated by the party who can first brand it. Parties attempting to brand, or otherwise appropriate cattle, without first making the proper record with the county clerk, are liable to a fine of $25 for each offense. Without such a public record no stock-raiser could protect himself from depredation by legal prosecution. Of late years parties have driven large numbers of sucking calves from their dams. The increasing demand for beef has created a stronger temptation for this illicit pursuit, necessitating greater efforts to repress it.

For the gathering of the animals for sale the same methods are used to some extent, but of late the cattle-raisers have been employing permanent agents in different parts of the country, paying them 50 cents for every calf branded and $1 for every steer herded for sale. A bill of sale is given to the purchaser describing the animals by brands, ear-marks, &c., which must be shown to the cattle inspector, who, in return, issues a certificate to the effect that the cattle correspond to the bill of sale. He keeps a permanent record of his official transactions, which is always open to inspection.

Among the noticeable changes made in the cattle business, since the close of the late civil war, is its concentration in fewer hands. The smaller owners found their stocks decreasing, and hence their profits did not meet their expenses. They have generally sold out, either to the larger proprietors or to the tallow and hide dealers. But few men now in the business have less than 1,000, branding about 250 calves. The herds range as high as 50,000; the number of calves branded being from 20 to 25 per cent. of that number. On these larger ranches are maintained from 2,000 to 3,000 horses, in order to supply the army of *vaqueros* with remounts. Large numbers of the cattle are killed for their hides and tallow. Some of these dealers sell to purchasers on the spot, while others ship direct to New Orleans or drive to Kansas. Several leading stock-raisers are mentioned as wintering from 2,000 to 3,000 each on the line of the Kansas Pacific Railroad.

The term stock-cattle, in Texas, includes cows, calves, yearlings, and two-year-olds. A party selling 1,000 stock-cattle would furnish 250 of each of the above classes, and charge a uniform price for the whole. The present price is $5 per head in specie. Three-year-old steers, or

four-year-olds generally bring from $10 to $12 per head. This class furnishes the staple of the Kansas trade. Four-year-olds, in good condition for shipment to New Orleans, bring $15 per head. The term beeves is applied only to animals four years old and upward. In good condition, they will net 500 pounds of beef per head.

The drought of last season caused a failure of the grass-crop in almost every portion of the State. It enhanced a growing difficulty in the grazing interest—the gradual failure of the abundant native grasses, which have hitherto constituted the great source of profits of the business. As the grasses are eaten down, or trampled down, weeds multiply and scatter their seed by the million. The mesquite brush is thickening upon the old haunts of the cattle. The conviction is forcing itself upon the minds of many of the more intelligent cattle-men that the range must be superseded by the stock farm, and that the business must assume a systematic character. The pasture-lands must be inclosed in order that the grass may gather headway.

The inclosure system has already been inaugurated in Southwestern Texas. Mr. Kennedy, of the Laureles ranch, has run a fence nearly fifty miles across the neck of a peninsula jutting out into the Gulf, thus inclosing, with fence and water, 169,000 acres. Within this inclosure are kept 50,000 cattle, the management of which demands 2,500 saddle-horses. Another enterprise of this character is reported from Fulton, Refugio County. The Rockport and Fulton Pasture Company proposes to inclose a tract of 115,000 acres with pine-plank fence on one side, the other sides bordering upon Nueces, Corpus Christi, Copano, and Puerto Bays and Chittepin Creek. The bodies of water are here so situated that thirteen miles of fencing isolates 200,000 acres. Upon the exterior portion of this area, called Live-Oak Peninsula, are the towns of Rockport and Fulton, whence are shipped all the cattle and beef west of the Guadalupe. The land inclosed for pasture is thickly set with the running, or hog-wallow, mesquite grass, the best native fattening grass. It is proposed to subdivide the area into fields, so as to allow grass to grow by keeping the stock away from it, and thus to keep a constant supply of fresh grass. The present object of the enterprise is to purchase lean cattle and fatten them for market. It is proposed to pay full market prices for range cattle and to rely for profits upon the increased value gained by grazing upon the pasture. It is expected that 40,000 or 50,000 beeves will be fattened each year.

It is further proposed to pay attention to the improvement of breeds of cattle and horses, a project entirely impracticable on the open prairie. Dairy farming will be added as soon as arrangements can be made. A refrigerating steamer, the Firefly, constructed according to the "Bray process," has taken several cargoes of fresh beef to New Orleans, and one cargo to Philadelphia. In both cities the beef is said to have given satisfaction. These improvements indicate that beneficial changes have already been inaugurated in the cattle industry of Texas.

IMPORTS INTO GREAT BRITAIN.

The following table exhibits quantities and values of certain imports into Great Britain (mainly those in competition with exported products of the United States) during the calendar years 1870 and 1871:

	Quantities, 1870.	Quantities, 1871.	Value, 1870.	Value, 1871.
Animal products:				
Bulls and oxen ..... number..	145,737	135,133	£2,622,778	£2,407,755
Cows ..... do...	24,910	73,639	391,269	1,031,999
Calves ..... do...	31,525	40,139	133,014	140,553
Sheep and lambs ..... do...	669,905	916,799	1,151,373	1,789,826
Swine ..... do...	95,624	85,622	356,471	292,089
Bacon ..... cwts..	536,844	1,017,907	1,668,096	2,507,470
Butter ..... do...	1,159,210	1,337,808	6,793,877	6,958,961
Cheese ..... do...	1,041,281	1,219,056	3,274,331	3,343,574
Eggs ..... great hundreds..	3,590,352	1,351,106	1,102,080	1,265,484
Hams ..... cwts..	30,320	65,114	101,145	195,325
Wool:				
From countries in Europe ..... pounds..	23,686,039	54,276,417	1,256,157	3,000,602
From British Poss'ns in South Africa.. do...	32,785,271	32,643,785	2,085,625	1,744,952
From British India ..... do...	11,143,148	19,494,009	345,356	697,523
From Australia ..... do...	175,081,427	182,753,585	11,136,138	10,846,342
From other countries ..... do...	16,666,078	30,343,540	534,343	1,147,387
Total	259,361,963	319,511,336	15,357,619	17,436,806
Corn ..... cwts..	16,756,783	16,832,499	5,790,550	6,470,789
Corn meal	5,741	7,881	2,682	10,712
Wheat:				
From Russia ..... cwts..	10,269,198	15,629,435	5,117,392	8,940,597
From Denmark ..... do...	327,919	130,370	165,301	77,791
From Germany ..... do...	3,348,214	3,049,031	1,949,805	2,018,292
From France ..... do...	253,644	134,841	140,119	72,345
From Austrian Territories ..... do...	60,472	239,147	29,071	158,475
From Turkey, Wallachia, and Moldavia.. do...	489,421	1,418,886	223,104	737,718
From Egypt ..... do...	194,950	884,396	45,239	489,741
From the United States ..... do...	12,371,922	13,465,057	6,564,341	8,062,414
From Chili ..... do...	599,337	549,529	360,841	358,427
From British North America ..... do...	2,838,361	3,279,264	1,537,855	2,005,698
From other countries ..... do...	237,791	687,690	130,959	424,132
Total	30,901,229	39,407,646	16,264,027	23,345,630
Wheat, meal, and flour:				
From Germany ..... cwts..	911,108	967,892	653,463	914,275
From France ..... do...	645,181	37,150	467,071	32,950
From the United States ..... do...	2,148,251	1,794,805	1,450,430	1,397,326
From British North America ..... do...	451,463	403,989	326,597	317,862
From other countries ..... do...	647,906	780,802	486,196	775,871
Total	4,803,909	3,984,638	3,383,761	3,438,284
Barley ..... cwts..	7,217,327	8,589,059	2,831,844	3,407,425
Oats ..... do...	10,830,630	11,007,106	4,381,607	4,001,687
Peas ..... do...	1,799,354	1,021,950	751,192	459,624
Beans ..... do...	1,505,798	2,975,651	648,755	1,269,424
Potatoes ..... do...	771,854	852,125	245,252	225,732
Seeds:				
Clover and grass ..... do...	213,779	340,377	603,298	927,113
Cotton ..... tons..	120,304	174,392	1,691,132	1,526,652
Flax and linseed ..... quarters..	1,490,695	1,334,945	4,016,016	3,744,588
Rape ..... do...	551,107	665,161	1,737,227	1,907,335
Cotton, raw:				
From United States ..... cwts..	6,395,079	9,317,368	31,345,348	33,220,259
From Brazil ..... do...	573,524	773,606	2,793,101	2,991,210
From Turkey ..... do...	93,245	23,099	406,391	86,778
From Egypt ..... do...	1,283,129	1,517,178	6,460,686	6,236,237
From British India ..... do...	3,049,434	3,818,630	9,980,121	11,609,338
From other countries ..... do...	564,224	394,009	2,492,108	1,623,723
Total	11,958,635	15,843,890	53,477,755	55,767,545
Esparto and other vegetable fibers ..... tons..	110,389	143,313	813,219	1,238,741
Tobacco ..... lbs..	86,430,318	111,517,416	1,680,140	2,563,625
Manure:				
Bones ..... tons..	92,032	94,212	591,701	591,998
Guano ..... do...	280,311	178,678	3,476,680	1,994,145

AGRICULTURAL PRODUCTIONS OF WURTEMBERG.

A statement of the agricultural productions of Würtemberg for 1870, recently received, represents the available area of arable land to be 2,138,659 acres, of which 1,905,236 are under cultivation, an increase of 5,001 acres over the previous year. The following table gives the average product per acre, the number of acres occupied by the several products, and the total of cereal and other products for 1869 and 1870.

Agricultural products.	Average product per acre in bushels.			Total acres under crops.		Total production in bushels.	
	1852 to 1866.	1869.	1870.	1869.	1870.	1869.	1870.
Cereals:							
Winter spelt	42.36	41.82	42.46	502,719	497,035	21,023,265	21,104,665
Summer spelt	30.10	29.45	30.20	3,088	3,196	90,940	96,570
Oats	29.60	30.41	24.94	322,768	321,958	9,815,500	8,030,140
Winter barley	21.70	26.44	24.49	3,874	4,213	102,450	103,185
Summer barley	25.17	26.31	24.27	227,187	231,924	5,978,915	5,628,685
Winter rye	18.62	22.29	21.44	89,214	86,816	1,988,650	1,861,600
Summer rye	17.09	15.93	16.31	15,855	16,052	252,660	261,850
Winter wheat	20.48	21.40	20.18	24,193	24,083	517,615	485,880
Summer wheat	17.14	18.67	18.50	7,486	8,105	139,755	149,915
Winter mixed spelt and rye	30.37	29.58	29.33	48,620	48,377	1,438,290	1,418,955
Summer mixed oats and vetches.	30.37	28.80	30.17	34,408	31,706	933,300	956,590
Millet	30.37	38.18	30.13	812	438	31,000	13,195
Buckwheat	30.37	34.08	26.48	93	91	3,170	2,410
Pulses:							
Peas	14.96	18.66	12.60	9,108	8,741	169,970	110,165
Lentils	14.77	16.03	11.97	9,561	8,917	153,240	106,755
Vetches	18.36	20.26	14.70	31,299	27,853	634,210	409,445
Field-beans	19.26	23.27	17.49	7,542	7,002	175,480	122,495
Garden-beans	19.26	23.29	17.54	1,998	2,027	46,430	35,530
Other products:							
Maize	22.34	25.37	23.40	4,527	4,690	114,835	109,740
Potatoes, (sound)	110.74	99.75	157.51	175,221	177,052	17,478,540	27,878,489
Potatoes, (not sound)						1,146,426	1,674,811
Sugar-beets, tons of 2,000 lbs	10.607	45.063	9.857	11,968	10,904	539,310	107,394
Turnips for seed, tons of 2,000 lbs.	10.607	.471	.985	31,501	33,000	184,486	325,017
White turnips, tons of 2,000 lbs.	9.887	9.886	9.888	16,742	16,949	165,515	167,578
Cabbage ..... number	3613.00	3153.00	2411.00	15,130	15,347	47,705,432	37,005,395
Yellow turnips ..... tons	7.72	6.49	6.91	288	296	1,869	1,986
Rape and rape-seed ..... bushels	16.11	16.63	16.41	16,953	21,604	281,940	354,670
Poppy ..... do	14.70	15.87	9.22	7,901	7,187	125,410	66,285
Flax, (combed) ..... pounds	125.95	123.11	73.13	17,490	16,775	2,154,178	1,226,731
Hemp, (combed) ..... do	171.48	171.89	149.71	19,723	19,504	3,390,314	2,920,006
Hops ..... do	524.01	351.91	614.81	12,432	12,648	4,375,030	7,776,120
Tobacco ..... do	1213.25	1182.50	1212.16	172	254	203,390	307,890
Chicory ..... do	.....	.....	.....	1,468	1,913	.....	.....

In 1870 there were in red clover 163,856 acres, yielding 349,426 tons, at the rate of 2.13 tons per acre; in lucerne, 38,917 acres, 92,961 tons, 2.39 tons per acre; esper clover, 27,974 acres, 46,210 tons, 1.65 tons per acre. The harvests of hay on 659,491 acres were, in 1870, 1,168,054 tons; in 1869, 1,478,114 tons; 1868, 933,442; 1867, 1,547,202; 1866, 1,331,697.

The fruit production has been quite variable. The average for 1852 to 1861 was 2,686,203 bushels of kernel fruits and 482,318 bushels of stone fruits. In the four years ending in 1870 the extremes were from 4,213,163 bushels in 1867 to 423,433 bushels of kernel fruits in 1869; and of stone fruits, from 797,296 in 1868 to 134,409 bushels in 1869.

Of 58,074 acres in vineyard in 1870 but 44,505 were cultivated, which yielded 3,692,209 gallons of wine, or 83 gallons per acre. Of this product 1,877,477 gallons were sold for $1,334,813, an average of 71 cents

per gallon. On this basis the total production was worth $2,621,468. The following table presents a view of the vintages for ten years past:

Year.	Production in gallons.	Average price per gallon.	Total value of production.
		Gold, U. S.	
1860	1,483,607	$0 57	$848,862 18
1861	1,164,619	1 47	1,712,948 43
1862	2,901,974	1 23	3,568,191 05
1863	3,448,306	1 04	3,581,763 28
1864	936,426	93	871,819 49
1865	1,205,703	1 98	2,387,629 67
1866	1,257,626	1 34	1,694,580 43
1867	3,105,932	80	2,495,188 66
1868	5,547,986	1 08	6,006,583 69
1869	1,703,793	1 12	1,919,002 95
1870	3,692,209	71	2,621,468 39

The prices of wools, according to local classification, (four-fifths being "bastard" or grade wools,) have been as follows since 1863:

Year.	German wool.	Bastard wool.	Spanish wool.
	Cents.	*Cents.*	*Cents.*
1863	32.7	42.8	59.5
1864	41.7	48.3	57.6
1865	39.05	43.7	55.8
1866	33.5	39.4	48.3
1867	41.7	41	60.02
1868	31.6	40	50.02
1869	20.08	29.7	42.8
1870	27.9	37.9	50.6

SOUTHERN PLANTING AND NORTHERN FARMING.

BY THE COMMISSIONER OF AGRICULTURE.

The great diversity of climate and soil which characterizes this extensive country renders the task of reviewing the principles and practices of farming, as they prevail in various quarters, exceedingly difficult; for that which observation and experience have taught to be entirely successful and profitable in one region, would be very inappropriate and entirely fail in another. In our agricultural journals and elsewhere we meet constantly with discussions as to the best modes of cultivation; and while the contestants, reasoning from their own experience, seem to differ essentially, it does not necessarily follow that each may not be right in the doctrine which he advocates; they may have only failed to recur to the fact that they reason from stand-points and accompanying surroundings which differ as essentially as the doctrines they respectively advocate. This may be illustrated by recurring to the oft-repeated discussion of the merits and demerits of deep and shallow plowing, while the solution of the problem is clearly to be found in the character of the particular soil to be plowed; for while a tenacious clay subsoil may be most profitably plowed to any depth which can be enriched by cultivation and manure, a good surface, having

for its base a sand or gravel subsoil, may be plowed so deep as to reach a bottom which has no capacity to hold either water or manure. Thus should that question be settled everywhere. The earth that is plowed the deeper will receive the most and retain the longer the rain that falls upon it, and of course furnish a greater space in which plants may feed and grow; and besides this, it affords a reservoir into which, in freezing weather, the rain may settle from the immediate root of the growing plant, which thus escapes from being embedded in ice, and spewed or frozen out, as clover and wheat often are in the Middle, Western, and Northern States. But the whole subject of deep and shallow plowing is one which every farmer must study in connection with the character of the soil he cultivates, and govern his practice accordingly; keeping in view, however, that a fresh, uncultivated soil, brought to the surface for the first time, may disappoint his expectations in its capacity for fruitfulness, until it shall have received the benefit of manure, and especially the amelioration of light and heat.

The subject of rotation of crops is one which deserves especial attention, and which must be considered with reference to the locality where it is practiced; but that it is an essential principle which must enter into the successful operations of the farm, is as certain as that a diversity of food conduces to the health, strength, and mental capacity of man. The analogy is by no means an imperfect one. What can be so plain, if we but reason from natural cause and effect, as that bringing into requisition again and again the same means of production, the same muscular powers of locomotion, the pursuit of the same train of thought, serves but to exhaust the soil, as it debilitates and exhausts the capacity of man? The earth will certainly cease to yield a product of the constituent parts of which it has already given all it has. And here let us consider the result and effect of continual restoration of the soil by the application of superphosphates, guano, and other commercial manures. Will not this supersede the necessity of rotation? All these may contain many of the component parts of production, and most of them are soluble in water, and, therefore, more immediately convertible into plant-food, stimulating in its character, quickly bringing into requisition the powers of the earth, and consequently in the same degree exhausting those powers; and like spirits habitually administered to the body, requiring an increase of quantity to produce a like effect; and eventually increase loses its power, and the earth, like the body, dies from exhaustion. There is an active, living principle in a diversity or rotation of crops, which nature dictates, as is exhibited in the practical operations of the farm. Dig up an old apple-tree, and a young one will not grow successfully upon the same ground, and no manure will make it grow. It is vain to theorize upon the subject, and we may as well conclude that there is no substitute for a rotation of crops in a proper management of the farm.

But what shall the rotation be? Here we must recur to the idea that while it is indispensable, it must be regulated by circumstances. In the Middle and some of the Western States the usual routine is clover, corn, oats, or spring barley, wheat, and with it timothy and clover; the former sown with the wheat in the fall, at the rate of about three quarts to the acre, and clover in the spring, about one bushel to five acres. This grass is mowed and made into hay the second year, and often the third; then the manure of the farm should be put upon the sod, and again it goes into corn. By this rotation the land continues to grow better and more productive from year to year.

There are points at the South, and also in the West, where this rotation

cannot be pursued, because the soil and climate are not congenial to the growth of all such grain. If so, let others be substituted; but if there be any point where grass of some kind cannot be raised, then it had better be abandoned as an agricultural district, and appropriated to some other purpose; for it may be questioned whether anything that grows out of the earth can be grown profitably where grass will not grow. Grass is the great renovator of the earth, and will always grow, with the use of lime, where land is worth cultivating.

The marked contrast between the modes of culture of the farmer of the North and planter of the South is not to be traced to any essential difference in the principles by which the cultivation of the earth should govern the one or the other, but is rather to be accounted for by the circumstances of these localities. Climate has had much to do with the subject, the character of labor more, and the education and habits of the respective populations greatly conduced to the essential differences in the practical operations of the farm.

In the Southern States it is as uncommon to meet with a barn, as a place of preparation of the products of the plantation, as it is in the North to find a farm without one. The planter contents himself with the reflection that his cattle require no such shelter from the elements with which he is surrounded; while the farmer estimates his barn, not only as a shelter for his cattle from wet and cold, but as a manufactory of the only fertilizers upon which he relies to improve his land; and not only this, but as a place where his products are prepared for the market without waste or deterioration, and from whence the straw, hay, and fodder are distributed to the cattle for their comfort and for the profit of the farmer. The southern planter will not realize the truth of this, although he finds himself scattering over a thousand acres; abandoning one spot with the hope of finding another less exhausted, or perhaps somewhat rested from the fatigues of a series of crops of the same thing; while the northern farmer, with his well-farmed hundred acres, will be found to increase the fertility of his land and add to his acres year by year. We have almost said that a barn is essential to the operations of the farm; that it is through its instrumentality that it is fertilized and improved; while the manure of the barnless plantation is wasted upon the desert air.

All other questions respecting the management and economies of plantation or farm management resolve themselves into the consideration of labor, its character and qualities. Our southern people are essentially agricultural. They have had no other subsisting interests to any extent. The existence of servile labor, imposed upon the minds of the land-holders, made it a part of their earliest education that labor was degrading. This was a necessary consequence of a system in which men were born to command and obey. However well educated, their minds were not turned to the subject of agriculture. They had no necessity to investigate the practical workings of the plantation; that was in other hands, whose special business it was to oversee as well the labor as the laborer. But now there is a new state of things, when it will become imperative upon the owners of estates to study agriculture as a science, to think and plan for themselves, to devise their own modes and schemes for the improvement of their lands and the economies of using hired labor. It does not necessarily follow that planters have suffered anything in the change of the character of their laboring hands; experience has proved that they have lost few or none of them; and when we remember the amount of work accomplished by one who earned at most but a mere subsistence, who was engaged in a duty of which he

would accomplish just as little as he might, and performed it as badly; and now, when he shall have been stimulated by the hope of gain, the fear of competition, the approbation of his employer, and, not least, the anticipations of an independent home, it is questionable, if not clear, that the planter will, in the end, be benefited by the change. There is, to say the least of it, great encouragement in the consideration that laborers in the South are not wanting, that their labor is not too expensive, and that the products of their soil are well paid for in a never-failing market.

There is a great disparity, even now, between the conditions of northern farmers and southern planters; for, apart from the mere consideration of the sacrifice of human life, the former were rather benefited by the results of the war, while the latter lost their all, and were driven to the resort of double and triple cropping to meet their actual necessities. Hence the soil has been exhausted, and nothing but the lapse of time will enable them to restore it; and that, too, by a rotation of crops to which grass must contribute largely. There is no mode by which the fertility of the soil can be so cheaply restored as by clover.

The size of plantations in the South is a great drawback to judicious farming. It has been clearly demonstrated that one hundred acres carefully and judiciously tilled will, with the same labor, produce as much as two hundred carelessly farmed. It is not enough that the surface be loosened, and seed be committed to the earth, to insure an adequate yield. The ground must be well and deeply plowed and plowed again; it must be well harrowed and harrowed again, until it is brought nearly to the condition of the seed-bed of a garden before the seed is committed to it; and then the seed should be selected with a degree of care which will insure the separation of the indifferent and the good. And this is a point of the utmost importance—far greater than is usually attributed to it. No matter what the seed may be, there will be found good, bad, and indifferent among it; and that these should be separated is as fixed a principle as that better seed will produce a better plant, and that a better plant will produce better cotton, tobacco, wheat, or corn. To separate them is not a question of labor or expense, for it may be relied upon that the result will repay it fourfold. How they may be separated may be answered by saying that indifferent seed is almost invariably lighter, and that the winnowing-mill, which will blow fifty bushels of seed from a hundred, renders a most valuable service to the result of a bountiful production.

There is one more subject to which the attention of farmers everywhere should be drawn—the pasturage of cattle upon land when it is wet. There is no one whose experience has not taught him that to plow land when it is wet is injurious to it. The reason is manifest: The earth may be said to be a set of mouths and lungs which feed and breathe; to plow it when wet shuts up its capacity to feed and breathe; in other words, it smears its surface so as to make it impervious to light, air, and heat, for the want of which it dies; and a death, too, from which resuscitation is extremely difficult. This same consequence is the result of pasturing cattle upon lands whose surface has been made wet by rain or otherwise; it is worked into a mortar incapable of producing fruit.

Farming, like all other of the occupations of life, requires a study of the scientific principles which enter into it, thought of the modes of their application, and especially the observations of practical experience; and these combined will always produce profitable results.

Prejudice often puts its seal of thoughtless reprobation upon what it

scornfully terms book-farming; but the farmer need not fear to learn his art from any source. If the chemist has analyzed the production of the soil, and found, to an unqualified certainty, its component parts; and if natural philosophy teaches that these component parts are taken from the earth, the lesson is certainly taught that the earth becomes exhausted by a continuous draft upon it, and eventually ceases to yield the product. If he discusses the chemical properties of lime, and its effect when brought in contact with the earth—when, therefore, it may be profitably applied and how used—such discussion may be turned to a most practical and profitable account by the farmer. If the entomologist has carefully studied the life and habits of the bugs, flies, and worms which infest the earth and all its growing vegetables, plants, and fruits, and teaches the nature and extent of their depredations, and thereby, to some extent, puts it in the power of man to thwart their operations; if he puts into our possession the facts with regard to the character of birds which are insectiverous and which are not, which are destructive and which are not, thus enabling us to guard against the one and protect the other; if the investigations of the botanist point out the nutritious, fibrous, or medicinal character of a plant, and where it will grow successfully and where it will not—what distinguishes one plant from another; if the natural philosopher treats of the nature of the earth itself, and how it is affected by light, and heat, and air, and how it gives life to the germinating seed, and strength and stature to the growing plant; if, in fine, it be the unchangeable laws of God which give vitality to every living and growing thing upon the earth, is it not well that the farmer should study to know what those laws are, and give them their most potent influence to produce the best results from the work of His hands?

DETERIORATION OF COTTON AND SUGAR-CANE.

BY THE COMMISSIONER OF AGRICULTURE.

By the extensive and intimate intercourse which this Department has with the agriculturists of the country, it has been strongly impressed with the idea that the products of grain, cotton, and sugar have much depreciated in quantity, and, it has been alleged, in quality also; that this is a very unnatural and alarming result, of what is undoubtedly an improved condition of agriculture, must strike the mind of the most casual observer; and it has induced the Department to inquire particularly, and gather the facts, and elicit the opinions of cotton and sugar planters and dealers on the subject, with the view of knowing whether it was within the scope of authority of this Department to come to the rescue or aid of interests so important. To effect this object, letters were directed to many intelligent cotton and sugar planters in all the Southern States tending to elicit answers to the following inquiries:

1st. Have these products deteriorated in quality or quantity?

2d. And, if so, to what source do you attribute such deterioration?

3d. Can this Department do anything to remedy the evil?

These letters have been extensively responded to, and it is gratifying to believe that much intelligent thought has been given to the consid-

eration of the subject. While much comment is made upon the effect produced by the great change in the character of labor, and the want of control over it, which the planter has once had, a compendium of the whole correspondence leads to the inevitable conclusion that both cotton and sugar have diminished in the quantity of production, but that neither has depreciated to any extent in quality, and the cause of failure is most unerringly traceable to the planter himself.

If this Department can impress upon the planters of cotton and sugar the indispensable importance of selecting seed and careful cultivation, it will have accomplished the introduction of a remedy which will cure the evil. What are the "Dickson," the "Boyd," the "Peeler," the "Hurlong," but the productions of selection? Does not all nature teach that in her operations "like produces like?" A letter in possession of the Department from an individual at Montezuma, Georgia, gives most satisfactory assurance that he has increased his crop of cotton 20 per cent. by the continued pursuit of selection for a few years; and all the testimony everywhere coincides with this experience.

In the preparation of cotton-seed, what is the practice now, and what should it be? The seed is promiscuously taken from the gin, carelessly thrown upon a heap, where it remains until planting-time, and without regard to any selection of good or indifferent is again committed to the earth to make its bad or indifferent product. Is this practice adopted to avoid the labor of selection, or is it really traceable to a want of faith in the superior value which good seed has over that which is indifferent; or is it a commingled feeling of doubt and slothfulness, with a want of that degree of energy, without which planting should be the work of other hands?

A few figures may serve to convince, when mere reasoning may fail. The vigorous plants which first mature are always best for selection. One hand will gather in a day 150 pounds of cotton which will produce 108 pounds of seeds, and this will plant two acres of ground; so that it will require 25 days' work to secure the selected seed for fifty acres. Allowing nothing for the cotton picked, this selection will cost, at $1 a day to each hand employed, $25. Assuming the product without the selection of seed to be at the rate of half a bale an acre, the amount would be 25 bales of, say, 450 pounds each, being 11,250 pounds, estimated to be worth at home 15 cents a pound, or $1,687.50. Now, the evidence is incontrovertible that a careful selection of seed will increase this product 20 per cent., or an amount of $337.50, from which deduct the $25 paid for selecting, and there is a clear gain of $312.50 upon a single crop of 50 acres. When it is remembered how seed is usually taken from the gin, and how it is stored away for future use, and the process of degeneracy occasioned by heating, it is not at all wonderful that the estimate of the increased yield from pure, selected seed should be 20 per cent. Indifferent seed produces an infirm and sickly plant, and a consequent diminution of cotton. Practice sanctions the use of from two to eight bushels of seed to plant an acre of ground, and the planter consoles himself with the idea that it is not lost; but this is only partially true, for this wasteful mode of converting seed into manure is not justified by the benefits derived. It would be far more profitable to subject the seed, as it accumulates at the gin, to an application of plaster of Paris, and muck from a swamp, or pine shucks or leaves and earth from the woods, and thus convert the refuse cotton-seeds into a compost which will tell with ten-fold the effect upon the crop of cotton to which it is applied. One bushel of well and carefully selected seed will be quite sufficient to plant an acre of ground in hills,

twenty inches apart and in rows four feet apart. But, after all, the planter must be convinced that a rotation of crop is absolutely indispensable to any operation for a series of years. If the plantation contains 200 acres let 50 of them be in cotton, 50 in corn, 50 in peas or beans, and 50 in grass; and let the crops alternate; and it cannot be doubted that if this process be pursued for a series of years, the 50 acres will have grown more cotton than 100 under other circumstances. The use of lime, if it can be procured at any reasonable expense, will always insure the growth of grass.

With respect to the cultivation of the sugar-cane, the same principles which it has been endeavored to enforce with regard to cotton-planting are equally applicable. While several correspondents press the idea of the necessity for a new importation of cane, the great weight of opinion is that the diminution in the quantity of production is occasioned by careless selection and planting of the cane, and subsequent careless culture. It is manifest that little or no regard is paid to the quality of the cane planted; that dry, hard, woody canes, often perforated with borers, are used, instead of those with healthy, succulent tops; and this under a thoughtless or careless impression that, if the sprout appears at all, it may produce a vigorous and healthy plant, whereas it will certainly maintain its sickly existence out to the end, with a result in production like to its origin. Beside careful selection, however, subsequent culture, in order to improve the character of cane, is all important. What but cultivation has brought to their present condition and excellence almost all the roots and seeds with which we habitually deal? What was the corn, the wheat, the potato, the apple, peach, pear, and plum before they passed through the manipulations of careful culture? Does not all nature teach that her productions were committed to the care of man that they might be cultivated and improved? And is it not equally manifest that there is no such principle as natural degeneracy which belongs to God's providence? for, if it were otherwise, the world could not have lasted four thousand years; it would have long since degenerated into a fruitless waste. It may be relied upon as a self-evident truth that careful culture will improve the character of any vegetable as certainly as the neglect of the selection of seed and its careful cultivation will degenerate it.

In the proper cultivation of sugar-cane, those same agricultural principles which experience has taught to be so conducive and so essential to the successful growth of fruits and plants must be observed. You must return to the soil what you take from it; and this must be done through the medium of a direct application of manures and a rotation of crops; and without either of these the experiment will prove a failure in the course of time. Manure alone will not do; rather depend upon rotation alone. A division of the farm into parts, such as is recommended for the cotton-plantation, is equally applicable to sugar, and the result of such a practice would double the crop upon every acre. The bagasse of a sugar-plantation is largely wasted, for the want of the application of a little expense which would add four-fold to its value. It is sometimes thrown in a pile to burn to death by its own internal heat, or actually burned as fuel in the operation of sugar-making, which is a most wasteful use, for the ashes are by no means equal to the thing itself. If, when this bagasse is taken from the mill, it were mixed with earth and lime, it would furnish an amount of manure equal to covering a space as large as that from which it was taken. As to cotton, plaster of Paris was recommended for this purpose, because it preserves the ammonia; whereas, in the cultivation of sugar, nitrogen, which is the basis of ammonia, is probably inimical to the formation of sugar.

A summary of all the information which the Department has been enabled to collect results in this conclusion: that Louisiana has a soil and climate adapted to the cultivation of sugar; that these lands are generally in the hands of intelligent planters; that they need but to pursue the plain dictates of natural laws to restore the cane to its superior excellence, and its product to its largest yield.

It is a subject of congratulation that the Department has been advised of the effort now being made to procure a new importation of sugar-cane into Louisiana, that the quality may be thereby improved. It may be so, even under the necessary process of acclimation and adaptation through which it must go. But, if it is to be planted time and again upon the same ground, and no selection of plants to be made, it, too, must soon "go the way of all flesh."

EPIZOOTICS AMONG SWINE.

By the Commissioner of Agriculture.

In the monthly report of this Department for April last, under the title "Diseases of swine," the attention of the people of the country was called to the enormous losses which were annually sustained from epizootic diseases among swine. All these diseases, however differently they may affect the life of the animal, are called "hog-cholera;" because of our ignorance of the subject we cannot give to each case a name specific enough to indicate its true character. In our comparatively new country veterinary surgery has not attained that degree of eminence as a scientific profession which its importance demands; on the contrary, we have actually suffered from the estimate which is put upon such learning and practice. But we are now startled by the fact that for the past ten years the loss of the whole country has exceeded ten millions of dollars annually by epizootic diseases, at which we fold our arms with amazement, and wonder what it is.

The June number of the National Live-Stock Journal, published at Chicago, furnishes, under the title "Epidemics among swine," an excellent article on this subject, in which, among other things, it says: "Under such circumstances it would seem as if the Department of Agriculture would have instituted some investigation into the cause, nature, and proper treatment of this malady, and have had something to offer the country in relation to the prevention and control of diseases which have proven so destructive." But this is unmindful of the fact that this Department has no means for the institution of such inquiry. Appropriations for its workings are all specific; and it would be a violation of the duty of the Commissioner to direct them to other objects than those specified. The work is so important and so peculiarly scientific and professional that it should call to its performance the greatest amount of learning with the best practical skill the country can command. The necessity for the action of Congress to make provision for the appointment of a commission which may thoroughly investigate the subject, as it did with regard to the diseases of cattle, cannot be more strongly enforced than it is in the article of the National Live-Stock Journal before referred to, and which we here quote as expressing the views of this Department on the subject:

> We have never been more strongly impressed with the necessity of a general investigation of this subject by competent authority than when considering the details fur-

nished by the last report of the Department. For these reports show the people to be absolutely ignorant of the matters which the general prevalence of these epidemics render it essential that they should know. "Hog cholera is the term indiscriminately applied to the diseases of swine generally," says the Commissioner, which illustrates very forcibly the inability of swine-breeders, in the present state of popular information, to distinguish one disease from another. Everything is known as hog-cholera, while there may be two or three diseases of entirely different types, which, if they could be distinguished one from another, the breeder could very soon bring under control; and the diseases being confused with each other, remedies are administered for one, which would have proved valuable for another, and he is now powerless to accomplish anything. Whether there is one epidemic disease or half a dozen, whether different epidemics are prevailing in different sections, or the same epidemic is prevailing everywhere and modified by climatic influences, are matters which will never be certainly known until the Department of Agriculture secures the services of a corps of competent, scientific gentlemen, and institutes, under their direction, an extended series of experiments and observations.

Here is one locality where rotten wood and bituminous coal are generally resorted to. Another, where a mixture of tar and sulphur is the popular favorite. Another, where tar, turpentine, and chlorate of potash were believed to be effective. Another, where coal-ashes, salt, sulphur, sulphate of antimony, soap-suds, charcoal, and rosin were used separately or in combination. Another where cooked food and tar form the basis of the farmer's hope. Another where common poke-root, fried in grease, was believed to be the only remedy. Another, where burning the skin with a hot iron was regarded as sovereign. Another, where salting, slopping, copperas, alum, and sulphur, and still another where alum, sulphur, copperas, madder, black antimony, and saltpeter pulverized and mingled with grain were generally relied on. In other localities coal-oil, coal-tar, and lime were used.

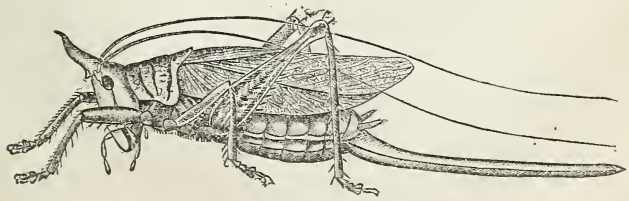
The popular ignorance of the matter, as shown by the remedies in use, is still more plainly shown by the popular ideas concerning the cause of the disease, which was believed to be occasioned by still-feeding in Westmoreland County, Pennsylvania; by poisonous mushrooms and nuripe berries in Buchanan and Surry Counties, Virginia; by ticks in Yalabusha County, Missouri; by lice and mange in Macon County, Georgia; from eating cockle-burrs in Phillips County, Arkansas; from the heavy beech-mast in Obion County, Tennessee; by eating cotton-seed in Madison County, Tennessee; to the mast in Laurel County, Kentucky; and to the want of it in Champaign County, Illinois, &c.

There is evidently a great public necessity, and most abundant room for some investigation of these matters, such as the Government alone can conduct to a satisfactory conclusion.

ENTOMOLOGICAL RECORD.

By Townend Glover, Entomologist.

A new grasshopper.—Two full-grown specimens, a male and a female, of a very singular and apparently new orthopterous insect, resembling *Conocephalus ensiger*, or conical sword-bearer of Harris, were taken alive in the green-house of the Department of Agriculture, last season, by Mr. J. H. Brummel. A short time previous, two half-grown larvæ were found, but died soon after being captured; and the remains of a fifth full-grown imago were found, when cleaning out the flower-pots in the winter.



These insects injured the leaves of the coffee-plants, rose-apples, and bananas, in the green-house, much in the same manner as is done by

our native katydids, by eating holes in the leaves and gnawing away the edges. Their jaws were remarkably strong and sharp, and when the insects were incautiously handled they bit so severely as to draw blood. The male was about 1.75 inch in length from the tip of the cone, or horn on its forhead, to the end of its wing-covers when closed. The female measured 3.05 inches to the end of the ovipositor, which itself was at least 1.25 inch in length. The general color of both male and female was a light pea-green, and the wings were delicately veined with distinct nerves, resembling the venation of leaves. A very marked feature in this insect, when alive, is that the labrum and clypeus are bright yellow, contrasting strongly with the jet-black of the mandibles, which, together with the cone or horn on the top of its head, gives it a remarkable appearance. This cone or horn, which is placed obliquely upward on the top of the forehead, forming a line with the face, is yellow beneath, black at the tip, and ends in an acute point, which is somewhat bent downward at its summit. No insect resembling it having hitherto been found in this neighborhood, there is but little doubt but that it has lately been imported with or on some foreign plants sent from South America or the West Indies, and as many exotic plants have been received from Balize, British Honduras, it is probable that this grasshopper came in the egg-state, on some of the plants from that locality, and was hatched out last summer in the green-house. This fact alone admonishes us how careful we should be when importing new and valuable plants from abroad, for if a large insect, nearly two inches in length, and fully the size of a katydid, can be so easily introduced, how much more readily the small and inconspicuous noxious insects hidden under the bark would be likely to escape notice, until they had perpetuated their species, so as to become partially naturalized and injurious to our plants. There is no danger, however, that this grasshopper will spread, and, as it is apparently very tender and accustomed to a tropical climate, most probably it would not be able to withstand the rigors of our winters in the open air, and as all were killed or caught as soon as seen in the green-house, there is very little probability of any being left to perpetuate their race.

Mr. Thomas has described this insect under the name of *Copiophora mucronata*, in the Canadian Entomologist for January, 1872, and gives it as his opinion that it approaches nearer *C. cornuta* found at Para, South America, or *C. gracilis*, at Napo or Maranon, than any other species of which he has knowledge.

NEW EARTH-WORM.—In connection with the subject of introducing new enemies to plants from abroad, it may be advisable to mention that at the present time a very large and apparently new species of earth-worm, thought to have been first introduced in the earth in which some Japanese plants were imported in the expedition under Commodore Perry, has increased and multiplied in the hot-houses so much as to have become a veritable nuisance. This worm is probably the same mentioned in the English Gardener's Chronicle of April 24, 1869, by D. T. Fish, F. R. H. S., under the name of the eel-worm, its habits and appearance being almost identical with that in the hot-houses of the Department of Agriculture. Mr. Fish, after stating that it is very injurious to plants in pots, and had been known for twenty years, says that it is "probably a tropical relation of the common earth-worm, as it cannot live out of doors in the climate of England and scarcely subsists in a green-house, but revels in the temperature of a plant-stove or orchideous house. It differs from the common worm in its mode of locomotion and in several of its habits. It

comes out at night on walls, stone floors, &c., and is as quick as an adder in its movements when disturbed. It seems impossible to eradicate it; it appears to breed with extraordinary rapidity, and is endowed with great muscular power, so much so that it is somewhat difficult to hold a large specimen between the thumb and finger. Lime-water, which is a sovereign remedy against the common earth-worm, appears to have little influence on it, and the only effective mode of destruction is to turn out the soil from the pot and catch and kill the intruder, taking care, however, not to knock or jar the plant, as this worm, instead of coming to the surface on being disturbed, like the common worm, will instantly recede to the center of the ball of earth and remain there undisturbed." In a later number of the Gardener's Chronicle for 1871, page 468, Mr. W. Baird speaks of a worm under the name of *Megascolex* (*Perichæta*) *diffringens*, found in three different gardens in England, in hot-stove houses, which is probably the same worm as the eel-worm referred to by Mr. Fish.

THE COLORADO POTATO-BEETLE.—The reports from Wisconsin indicate that this insect is not so numerous as last year. In Kalamazoo County, Michigan, they have decreased 50 per cent., and other counties send similar reports, though in Wayne County "they have appeared in myriads." In Ohio they are very numerous, as will be seen by the following extracts:

Warren County.—The potato-bug is doing great injury; everybody is catching and killing them, though some rely on Paris green.

Pickaway County.—Injurious to crop.

Wyandotte County.—Plenty.

Franklin County.—Present in countless numbers, but doing little damage. Cool weather prevents their eggs from hatching, while the lady-bugs devour them. Great efforts are being made for the destruction of the pest.

Ross County.—Present in great numbers.

Lucas County.—Numerous; farmers systematically killing them.

Champaign County.—Millions at work on the potatoes.

Delaware County.—Quite troublesome.

The Kentucky reports represent the insect as just making its appearance in several counties:

Shelby County.—The advance guard of the potato-bugs made their appearance May 10.

Spencer County.—Potato-bugs appearing for the first time; never before within twenty miles. (Locusts also plenty.)

Indiana reports are as follows:

Perry County.—Colorado bugs more numerous than last year, but have, as yet, done but little damage.

Lawrence County.—The lady-bug is destroying the eggs of the potato-bug, which is doing but little damage.

Howard County.—Colorado beetles too scarce to do any damage.

Marshall County.—Not half as bad as last year.

Posey County.—Not many bugs yet.

Knox County.—Colorado bugs more numerous than last year.

Wells County.—Has made its appearance within a few days. The only remedy is to destroy them before they deposit their eggs.

Harrison County.—Have again appeared in great numbers, and are likely to destroy most of the crop.

In St. Cair, Montgomery, and Ogle Counties, Illinois, the beetles are "not so numerous as last year." Madison, Putnam, Hancock, and Tazewell Counties report "plenty of bugs." In Massac County "a new

potato-bug, half an inch long, and of a reddish color," has appeared. (Will the correspondent please send specimens?)

Four counties in Missouri report as follows:

Pulaski County.—Potato-bugs very destructive, especially to the Early Rose.

Phelps County.—Potato-bugs numerous.

Perry County.—Bugs in force.

Franklin County.—Not so destructive as last year.

In Kansas the "bugs" have appeared "in diminished numbers."

In Meeker County, Minnesota, the insects have appeared in large numbers, threatening mischief. Will be freely dosed with Paris green.

Upshur County, West Virginia.—Potato-bugs destructive in some places. (This may not be the "western" potato-bug.)

NOTE ON PIERIS RAPÆ.—This insect, the larva of which has been such a terror to the cabbage-growers in the North, has reached the District of Columbia, specimens of the perfect insect, or butterfly, having been taken by Mr. Charles R. Dodge, during the present month, flying about his garden. Its presence was reported in Baltimore last summer.

CHEMICAL MEMORANDA.

BY RYLAND T. BROWN, CHEMIST.

This division of the Department has completed the analysis of the first installment of commercial manures, and while the work of collecting specimens for the further prosecution of this task is progressing, the laboratory is engaged in the analysis of marls, specimens of which have been accumulating for the past year, representing a great variety of substances from different parts of the country. The results obtained from the examination of commercial manures will appear in the forthcoming annual report.

The marls presented for analysis may be arranged in three classes, to wit:

1st. Shell-marls, composed chiefly of marine shells, in a more or less advanced state of decomposition.

2d. Green-sand of the early Tertiary age.

3d. Lime-marls, consisting of calcareous sediments from water holding lime in solution.

Within the next month we hope to be able to present a full report of each of the above classes. At present we are able to give, as an example of the first class, only a single analysis. The specimen was sent by J. P. Dillingham, of New Berne, North Carolina. It may be taken as a fair sample of the "shell-beds" which are common to the Tertiary belt lying between the mountains and the Atlantic coast, and stretching from the Hudson River to Florida.

Analysis of shell-marl, from J. P. Dillingham, New Berne, North Carolina.

Water, determined at 100° C	0.650
Organic matter	2.633
Peroxide of iron and alumina	4.001
Phosphoric acid	0.099
Lime	13.451
Potassa	.331
Carbonic acid	10.600
Silica	68.235
	100.000

THE "POISON SOILS" OF TEXAS.—The Department has received a number of letters from Texas describing a singular phenomenon frequently occuring in the cultivation of the rich prairie soils of that State. With these letters we have received several samples of the soil spoken of, and have devoted much time and attention to a careful examination of them. We make the following extract from a letter written by G. W. Danover, of Breckinridge, Dallas County, Texas:

* * * I send you a specimen of our poison soils. All our soils for many miles in every direction are of the same character, therefore I supposed one specimen would be sufficient. There is no perceptible difference between the poison soil and that which surrounds it. It is distinguished only by the premature decay of vegetation growing upon it. It exists in limited areas, as far as I can learn, throughout the State, in every variety of soil. Sometimes cotton covering 50 acres dies on one plantation. We can never tell where it exists until we plant the ground in cotton, fruit-trees, or root vegetables. The natural grasses, prairie and mesquite, grow well upon it. Timothy and clover are not adapted to this soil and climate. Vegetation that derives most of its vitality from the tap-root is more liable to die than that supported mainly through lateral surface-roots. It does not affect, injuriously, cereals, corn, wheat, &c. * * * Trees usually grow one or two years before dying. Root vegetables and cotton die and rot just before fully developing themselves. * * * The soil is loamy when properly cultivated, but very tenacious when wet. It is underlaid with a thick bed of soft limestone. This is called the "black sticky land." It produces from 25 to 75 bushels of corn, and from one-fourth to one and a half bales of cotton, when not affected by the poison, as we call it. * * * In procuring this specimen I removed the dirt four inches below the surface, then cut a slice ten inches deeper. The difficulty doubtless lies some distance below the surface, from the fact that often one stalk of cotton will die, and another standing almost against it will grow luxuriantly. On examination their roots will be found to be different in structure, the dead one having a straight root and the living one mostly lateral roots.

The specimen of soil sent to the laboratory by Mr. Danover was very dark colored—nearly black—with a slight brown shade, and so hard that it was pulverized with difficulty. A preliminary qualitative examination showed nothing new or unusual in the soil; so the cause of its peculiarity is to be found in the proportions of the ordinary soil ingredients, or in the manner in which they are combined. Subjecting a sample of the soil, well pulverized, to the action of cold distilled water, we found but nine hundredths of one per cent. (.09) soluble. Not fully satisfied with these results, we determined, by an ultimate analysis, to ascertain the exact composition of the soil as the only reliable method of solving the problem. This analysis gave—

Water determined at 100° C.	7.100
Carbonaceous matter and hydroscopic moisture	6.964
Humus, soluble in a solution of carbonate of soda	1.673
Insoluble humus, (extracted by caustic potassa)	0.213
Sesquioxides of iron and alumina	14.096
Phosphoric acid	0.206
Lime	3.166
Alkalies, (potassa and soda)	0.740
Insoluble silica	63.079
Oxide of manganese	2.072
Loss	0.709
	100.000

The first observable features in this analysis are the entire absence of sulphuric acid and the large per cent. of humus which, in the fresh soil, evidently exists as humic acid in combination with lime and the alkalies constituting insoluble humates. This will account for the very small

amount of soluble matter in the soil, and furnish the most plausible explanation of its "poisoning" effect on certain crops.

In a clay sub-soil, charged with water to the point of saturation for at least a portion of the year, the organic matter which it contains will be converted into humic acid instead of undergoing the usual decomposition into carbonic acid, ammonia, and water, which a free exposure to the air will effect. This explains also the fact that crops which draw their nutriment by superficial roots are not unfavorably affected in these spots. By exposure to atmospheric influences the surface-soil loses its humic acid by conversion into soluble humus.

What this soil needs is, 1st. A thorough underdrainage, which will relieve the sub-soil from saturation during the rainy months and permit the air to circulate through it freely at all times; and 2d. After the sub-soil is relieved from saturation it should be broken deeply so as to bring it more fully under the influence of the air. Sub-soiling, however, will be of no value unless there is first a good underdrainage; for the rain, saturating the sub-soil, will run it into a mass as compact and as impervious to the air as it was before it was broken. The soil contains a high per cent. of lime, but there is scarcely a trace of it in the sub-soil in a soluble form. A heavy dressing of quick-lime, plowed in deeply, would evidently take up a large amount of humic acid, and thus relieve other elements of plant food which are now locked up as insoluble humates. But, without underdrainage, this effect will only be temporary; indeed, the action of lime on a saturated sub-soil tends ultimately to render it more compact and impervious. The use of gypsum will improve this soil by supplying sulphuric acid, an element in which it is entirely lacking.

We would, therefore, recommend for these "poison soils," 1st. A thorough underdrainage; 2d. Deep sub-soil breaking; 3d. The application of quick-lime and gypsum in liberal quantities.

Beet-sugar.—The problem of furnishing sugar to supply the large and constantly increasing demand for it throughout the civilized world is daily augmenting in importance. Sugar, in some of its forms, is widely distributed throughout the vegetable world, and though it is seldom found in chemical combination with other substances, yet it is generally so mixed with a number of other proximate principles that its separation in a crystallizable form is very difficult.

When it is ascertained that the juice of the sugar-beet contains from 10 to 13 per cent. of crystallizable sugar, and that the beet can be produced in unlimited quantities, most persons will suppose that the sugar problem is solved. But beet-juice, in addition to sugar, holds in solution pectose, gum, albumen, asparagin, betain, oxalic acid, citric acid, phosphoric acid, sulphuric acid, chlorine, and silica. Besides these there are variable proportions of potassa, soda, lime, iron, magnesia, rubidium, and manganese, from all, or the greater portion of which, the sugar must be separated before it is fit for domestic purposes. Most of these substances, as compared with the sugar, are present in very minute proportions, yet these and their chemical derivations defeat all attempts to procure the sugar by evaporation merely. The efforts to manufacture sugar from beets or sorghum in this country have failed just at this point; and even in Europe, where the beet-sugar enterprise has been most successful, this question of defecation is far from being satisfactorily settled.

The albumen will coagulate when heated to 180° F., and in its coagulation it will entangle and carry with it many of the less soluble organic substances; and with this view, an additional amount of albumen, in the form of eggs or milk, is frequently added. If the juice be

exposed to the air any considerable length of time before it is heated, the albumen and other nitrogenous substances will begin to evolve ammonia, the presence of which interferes materially with the crystallization of sugar. But suppose the albumen has been promptly coagulated and the defecation has removed such substances as pectose, gums, &c., yet there remains in solution the acids which tend constantly to convert crystallizable sugar into glucose, which is practically uncrystallizable. It is an urgent necessity that these should be neutralized as soon as possible. Caustic lime is commonly used for this purpose; but in the presence of bases, sugar plays the part of an acid, and enters readily into combination with these. This compound with lime has a bitter taste, and is very soluble in cold water. Its solution, however, if tolerably concentrated, becomes opaque when heated, and presents an appearance of coagulation, resembling that of white of egg. (Miller.) In the presence of this peculiar substance the crystallization of sugar is interfered with, and thus the loss is much more than that taken up by the lime. In this state the compound of sugar and lime may be removed by bone-black, but still the loss of sugar is considerable. Another effect is produced by the use of caustic lime. Potassa and soda exist in the beet juice in the form of carbonates, but the presence of lime immediately reduces them to the caustic form, and they take up sugar to supply the place of carbonic acid which they have lost. The proportion of these alkalies in the beet is very small, it is true, but the loss of sugar in this direction adds its mite to other losses until the aggregate interferes seriously with the profits of the manufacture. Even in the most successful establishments in Europe, 75 per cent. of the sugar actually contained in the beet is rarely obtained in a crystallizable form.

In the very interesting experiments of Professor Goessmann, of the Massachusetts Agricultural College, we have an attempt to obviate most of these difficulties on purely scientific principles; and, we are happy to say, with results which bid fair to lead to ultimate and complete success. Fifty pounds of the freshly expressed juice of the electoral beet was brought rapidly up to a temperature near the boiling point, (80° C..) when the source of heat was withdrawn and one-half of 1 per cent. (4 ounces) of caustic lime, reduced to the condition of milk of lime, was stirred into the juice. The heat was then raised fully to the boiling point, when it was again removed, and after standing fifteen minutes, the clear juice was drawn off by means of a syphon. Several advantages are gained by heating the juice before adding the lime; the chief of which are the more perfect coagulation of the albumen and the consequent separation of the organic substances which it carries with it; the more perfect neutralization of the citric, oxalic, and phosphoric acids, and the precipitation of the insoluble salts thus formed. The asparagin present in the juice is rapidly converted, by the action of caustic lime, into asparaganic acid and ammonia. The acid combines with lime and is thus disposed of, and the ammonia escapes in the gaseous form, being insoluble in hot water. These are important advantages gained by hot defecation.

After this the clear juice was concentrated by evaporation to 30° Brinx, and when cooled to 125° F. (50° C.) it was treated with carbonic acid, which had the effect to liberate the lime from its combination with sugar, and precipitate it as calcic carbonate. The clear juice, heated to near the boiling point, was passed through a filter of bone-black, and by careful evaporation was crystallized. By the use of carbonic acid the greater portion of the sugar which has entered into combination with lime, potassa, and soda may be recovered.

By this process from 8 to 9.4 per cent. of crystallized sugar was obtained from juice holding in solution not exceeding 13 per cent. These results are certainly very encouraging.

These successful experiments are the first fruits of our system of agricultural colleges, and indicate very clearly an important feature in their mission.

We commend the report of Professor Goessmann to the attention of all who wish to investigate the beet-sugar question. The ultimate success of this enterprise in our country is suspended chiefly on the chemical questions involved in separation and crystallization of the sugar, and that these will ultimately meet a favorable solution at the hand of science, no longer admits of a rational doubt. The high price of labor in this country, which is frequently urged as being fatal to the enterprise, is fully offset by the price of sugar here as compared with the European market. Add to this the fact that in Germany and France the beet crop pays from $40 to $50 per acre tax to the government, and the preponderance will be fairly on our side.

BOTANICAL NOTES.

BY GEORGE VASEY, BOTANIST.

LIATRIS ODORATISSIMA, *Willd.*—This plant, which is a native of the Southern States, has been the subject of some recent inquiries. It grows in low, sandy woods from Southern Virginia to Florida. It is known by several local names, as wild vanilla, deer's-tongue, and sea lavender. The leaves have a strong vanilla odor. The plant grows three to four feet high, with a simple straight stalk, terminated by a corymb of bright purple flowers. It belongs to a genus which is represented by eighteen or twenty species in the Southern States, none of which are specially odorous except this one. Several species are found in the Northern, and several in the Western States. They all have showy purple flowers, some of them in long spikes, and are known by several local names, as button snake root, blazing star, &c. The leaves of the first-mentioned species (*L. odoratissima*) have been employed to give a pleasant fragrance to tobacco and cigars. They are brought to market in small bales. The lower leaves of the plant are about six inches long by three inches broad. It is said to be very abundant in Florida. We are not informed as to the market price of the leaves, but do not doubt that it depends much upon their mode of cure and their soundness. For wrappers of cigars the leaves would need to be sound and unbroken.

Probably if the plant were submitted to cultivation, and the stalk cut back so as to favor the development of large leaves, it might be improved in quality and value. We would be glad to see its use extended, for it has no hurtful properties, and since it improves the flavor of tobacco, the more of it employed in the manufacture of that article the better.

SHADE AND ORNAMENTAL TREES.—We have yet much to learn, or perhaps we should say much to practice, with regard to suitable shade and ornamental trees in cities. In some instances it seems to have been the rule to plant anything that could be easily procured, particularly if recommended as a rapid-growing tree. Hence so many of our streets have been overrun with the ailantus, so sadly misnamed the "tree of heaven." Its very disagreeable odor at flowering time has caused a raid which threatens to result in its extermination. The next raid will

probably be upon the white poplar, or cotton-tree, (*Populus alba, L.*) When its seed pods are matured there is a period of eight or ten days during which the air is filled with the cottony down of the seeds, causing much annoyance. Still, this tree has many good qualities, and we hope it will be left at least until better trees can be reared.

The locust (*Robinia pseudacacia*) has almost disappeared from cultivation at the North by reason of the ravages of the borer. The silver maple is desirable for its rapid growth and beautiful silvery leaves, but in some locality it has been sadly injured by a borer, which has caused the death of many trees. Its long slender branches render it particularly liable to injury from storms of sleet. No native tree we have is better adapted to the purposes of shade and ornament than the sugar maple. Its foliage is full and dense, and its form is that of a rounded cone of beautiful proportions. It is also clean and free from insect enemies. It would be well if, in planting shade-trees on our streets, there could be a suitable alternation of different kinds, some of rapid growth for temporary use, and others for permanence. Some attention should also be paid to variety. Probably the very best trees for general street-planting are the different varieties of the maple. Next in value we would place the elms. For intermediate and temporary planting the box-elder and the ash may be mentioned. Here and there should be the bass-wood, or linn, the tulip-tree, the horse-chestnut, and the buckeye. The sycamore and catalpa are too open and straggling in their habit to be valuable for shade, but give an agreeable variety to a park. The conditions of latitude and temperature will also modify the selection of suitable varieties.

VEGETATION IN WESTERN KANSAS.—We have been furnished with several specimens of young grain plants, and of lucerne, from some points in the extreme west of Kansas, which compare very favorably in thrift and size with the same plants in the Atlantic States at the same period of growth.

Mr. R. S. Elliott, industrial agent of the Kansas Pacific Railroad, writes:

> There is no room for doubt that if ground were broken at Fort Wallace an immense amount of forage could be raised without irrigation. I shall, this year, give sorghum, millet, and Hungarian grass a better test than I was able to give them last year. I expect also to plant a plat of Indian corn. All my operations are without irrigation. In the valley of the Smoky, below Fort Wallace, a large body of land can be irrigated, and quite extensive gardens are being prepared by direction of the officers; but I hold that a large supply can be grown of rye, sorghum, corn-fodder, and perhaps corn, &c., on the upland north of the fort, without irrigation.

GRASSES FOR FIXING A SHIFTING SOIL.—Several inquiries have recently been made for a kind of grass adapted to growth on the sandy borders of our lakes, and the ocean, for the purpose of fixing the shifting sandy soil. Several kinds of long-rooted, deeply penetrating grasses seem to be well adapted to that purpose. On the shores of Lake Michigan the long-leaved Calamagrostis (*C. longifolia*, Hooker) takes possession of the sandy ridges, in connection with several species of low willows, and makes a permanent barrier against the encroaching waves. The sand-reed (*Calamagrost is arenaria*, Roth.) occurs on low, marshy borders, not only of the great lakes, but also of the ocean coast, both in this country and in Europe. Indeed, in some instances the planting and preservation of this grass have been provided for by law. The roots are very tough, and are used for making brushes and brooms, and the leaves are used for thatching, for mats, and for paper. For forage this grass is valueless, being rejected by all kinds of animals.

This subject has excited attention in Europe, as will be seen by the following extracts from an article on "The Caspian willow and buffalo-grass as a means of fixing blowing sand," recently published in the "*Landwirthschaftliches Centralblatt für Deutschland.*"

The Caspian willow has been recommended lately for fixing blowing sand. This species, however, does not come from the Caspian Sea, as one might conclude from the name, for we have never seen it there, at least on the western side; but it grows without doubt all over the Empire of Russia, and even to the interior of Siberia. Possibly its home is the sandy wastes of Southern Siberia, and from thence it came to us by way of Astrachan. At any rate we have received it through Poland. The introduction of home plants from foreign countries on account of their utility is not a new thing. The meadow-grass (*Phleum pratense*) was taken from England to North America, and there discovered to be a good fodder-plant. Englishmen found it cultivated, and took the seed back to Europe, where ever since it has been highly esteemed under its North American name. The Caspian willow is probably a small-leaved variety of another species, which has been found in Pomerania by Wildenow, and received the name of *Salix pommeranica*, but which is not different from the Linnean *Salix daphnoides*. Many, however—among them Wildenow—consider it as a distinctive species under the name of *acutifolia*. Besides the smaller leaves, green on the under surface, it grows more rapidly on sandy ground, does not soon become a tree, and has slender hanging branches. As a binding plant, *S. acutifolia* has the preference over the ordinary *S. daphnoides*. *S. acutifolia* also has the merit of having its branches covered with a purplish bloom, and thus giving a charm to the landscape when seen against a dark background of evergreens. It also unites well with the red twigs of *Cornus alba* of Siberia. We can also recommend *S. longifolia*, Host., (commonly catalogued as *S. dasyclados*, Winun,) to protect sandy shores. We saw it grow luxuriantly on a sandy field belonging to the Flottbecker school of forests. The shoots attained a length of six to eight feet, and made good withes in winter, which were used in place of those that previously had to be purchased at a high price.

A grass has recently been brought into notice for the purpose of fixing sandy soil, which is widely distributed through North America, from Canada to Texas, and furnishes food for the buffaloes or bisons. From this fact it has acquired the name of buffalo-grass, but is known scientifically as *Buchloe dactyloides*. This grass makes long runners, and consequently covers the ground rapidly. It is very nutritious, which adds to its value, and if it will grow as well with us as it appears to in New Holland, we shall have a fodder-plant of more value than lupines; just the thing for the barren sands of the Mark and other northern districts.

In our own country several native species of willow will undoubtedly be found adapted to the same purpose—for instance, *Salix tristis*, *S. petiolaris*, *S. cordata*, and particularly the *Salix adenophylla*, Hook., recently detected on the sandy shores of Lake Michigan, where it flourishes on the ridges of pure sand thrown up by the waves. There is probably a mistake with reference to the buffalo-grass named in the quotation. If it really be the *Buchlöe dactyloides* the statement is of much interest. It would be singular if this grass, which has been entirely neglected here, should be tested and found valuable abroad, and then come back to us as a claimant upon our gratitude and favor. It possesses an important advantage over the coarse *Calamagrostis* in its valuable grazing properties. In California the giantlyme-grass, *Elymus condensatus*, is said to do excellent service in fixing the soil on the banks of rivers and creeks.

In connection with this subject, we may notice that attention is being directed to the grasses best adapted for cultivation in the South and Southwest, particularly on sandy lands. Mr. F. W. Robbins, Matagorda, Texas, in acknowledging the receipt of a package of rye-grass seed, inclosed a stalk of grass, which he says is not found on the fresh land, but is taking the place of other grass on sandy land where the sheep have pastured and manured. He wishes to know whether it is a good grass or not. The specimen sent is a species of *Agrostis*, (*A. verticillata*, Vill.,) a grass which is found in Texas, New Mexico, and California, as well as in some parts of the Old World. It is perennial, and

although hitherto neglected agriculturally, may be found of value in some situations.

Another correspondent sends specimens of a grass which he says grows freely on the poor land of a neighboring farmer. It is the *Festuca tenella*, which is notorious for its growth on dry, thin soils, and the more of it a farmer has the poorer he will be.

Mr. J. M. Morehead, Greensborough, North Carolina, writes to inquire the botanical name of a grass found in a few places in that and adjoining counties, where it is known by the name of mountain-grass. It is the tall oat-grass, *Arrhenatherum avenaceum*, and is well known on the continent of Europe as a valuable agricultural grass. Mr. Morehead says it is "the earliest of all our grasses, is admirably adapted to pasturing, withstands the freezes of winter and drought of summer well, and it is almost impossible to kill it out by continual pasturing. With the exception of clover, it is the very best grass for this section of country. It yields annually two or three excellent crops of hay."

MICROSCOPIC INVESTIGATION.

PEAR-TREE BLIGHT.

By Thomas Taylor, Microscopist.

"For nearly a hundred years, blight of the pear has been a terror and despair to growers of its fruit." This disease is known under a variety of names—winter or frozen sap blight, leaf blight, summer blight, &c. It is quite different from insect blight. Its true character is, doubtless, of fungoid origin. Since the temperature and hygrometric state of the atmosphere and the conditions of the soil, whether acid or alkaline, pulverent or stiff, affect fungi by either retarding or fostering their growth, it becomes a matter of interest to ascertain how far observations made in relation to pear-tree blight will agree with the fungus theory.

Some forms of fungus are favored by heat and dryness, such as the oidium of the European grape-vine, while the fungus of the native grape-vine is favored in growth by moisture and heat. The first may be called a saccharine and the second an acid fungus, being favored by the acid condition of the leaf and wood.

Yeast, which is a fungus of a low order, when in its active state always exhibits an acid reaction; if well washed, the globules become much less active; but by exposure for a few hours to the air their activity is restored, the acidity being thereby again developed. The addition of a small quantity of vegetable acids, such as acetic or tartaric, to washed yeast immediately restores its activity, but when a larger quantity of acid is employed the process of spore-budding is arrested. The mineral acids, such as sulphuric, even in small quantities, immediately stop yeast fermentation; sulphurous acid acts in like manner. A small quantity of free alkali, or a strong solution of common salt, also prevents its fermentation. Nitrate of silver, corrosive sublimate, and sulphate or acetate of copper checks its growth immediately on application; also oxide of manganese, oxide of mercury, strychnia, small quantities of kreosote, oil of turpentine, and many other essential oils. When, however, the low forms of fungi once commence, the vegetable

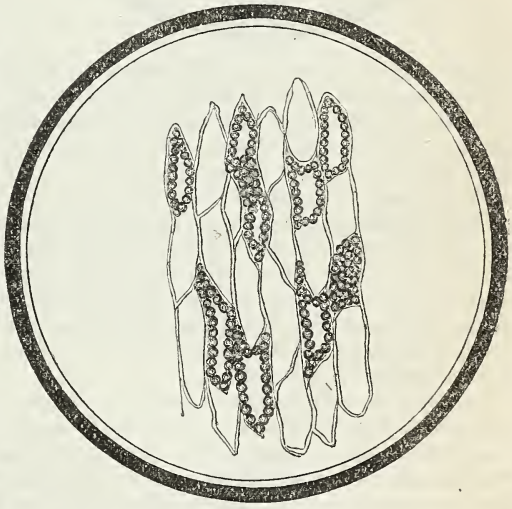
bases have no power of arresting although they may retard their progress. Boiling-water, also, for a time arrests the progress of fungi. A knowledge of the habits of fungi and of the substances and conditions which retard or foster their growth will, to some extent, enable fruit-growers to modify fungus blight. But independent of all chemical appliances, drainage, and sheltering by belts of timber or hedges, would be of great importance, when the land or orchard is devoid of natural sources of protection. It is not simply to the conditions of high or low temperatures, or to the hygrometric state of the weather that blight, rust, molds, &c., owe their origin, but to a combination of many conditions. Heavy rains on well-drained soil will not present the same conditions to vegetable growth which they would on poorly drained. A favorable condition of soil and climate is required by foliage of spring, summer, and autumn, for a healthy performance of its functions. Under highly favorable conditions of climate and soil the wood becomes matured and, consequently, the fruit and the leaves drop when, and only when, the uses for which they were formed have been accomplished. The wood of every tree when fully matured has condensed the sap, forming it into wood or other solid material; consequently, the cells under such conditions are comparatively empty, and have room for the expansion of any limited portions of sap remaining. Climatic derangement in the animal as well as in the vegetable economy is frequently produced from sudden changes of temperature. A mantle of ice, or of snow, will not necessarily prove hurtful to plant-life; flowers are sometimes found blooming under snow. It is from the unprepared condition of plants and trees that injury from frost mostly spring. It is not unusual for a shepherd on the mountains of Scotland, while tending his sheep to save them from perishing in snow-drifts, to immerse his plaid in a brook, wring it out, and wrap it round himself. It freezes, and ice being a non-conductor of heat, he is kept warm in his frozen mantle. The Laplander lives in huts of ice or snow to shield himself and family from the bleak winds of winter. Ice, snow, and water, are classed as non-conductors. It is when water is converted into vapor that the body from which it evaporates becomes cold. Millions of pounds of paraffine have been for a long period annually extracted from coal-oil by taking advantage of this principle; by the evaporation of ether in contact with a vessel containing coal-oil the paraffine freezes solid in the oil and is thereby easily removed. But it is not the cold, properly considered, which produces the disease owing to the bursting of plant-cells but to the stoppage of the functions of assimilation in the presence of myriads of germs of fungi and infusorial life. Healthy plants will decompose any foreign substance suitable as food and assimilate it in the support of their own function.

"Fungi consists of two principal elements, the vegetative and the fructifying. If we take, for example, the common mushroom, the vegetative is represented by the spawn which, for a time, carries on all existing functions of the plant; the fructifying by the stem, with the cap and gills which bear nearly the same relation to the spawn as the flower with its various organs to the stem on which it grows. The spawn may flourish for years without bearing any fruit, but fruit can never be produced without spawn."

The spawn of fungi, whether in a cellular or fillamentous condition, undergoes an infinite variety of modifications; it is developed in various situations, and even when present beyond a doubt among the tissues of plants, at whose expense it lives, is very difficult to detect, in consequence of its extremely minute condition.

In entering upon an investigation of this kind, it is necessary, sometimes, to experiment with suspected wood fibers taken from living or dead organic matters, with a view of developing to a higher state of growth the dormant germs. Some of the means employed consist in subjecting suspected specimens to a favorable temperature and moisture, and suitable food; in this way, sometimes, forms will be exhibited after the lapse of a suitable period, by which means the true character of the fungi is known. In examining pear-tree blight, I have taken advantage of such means to ascertain the presence of fungi in suspected portions of an affected pear-tree. I removed several portions of the bark from various points of the tree, and examined them with an object-glass of about one inch, which for this purpose may be considered a low power, but no well-defined forms of mycelium (spawn) were visible. I next placed specimens of the healthy bark and the blighted in separate vessels of water, to be macerated; in about eight days the blighted portions indicated the separation of the last cambium layer from the liber, which appeared as a translucent membrane, the largest portions of which were not over one-tenth of an inch, and did not exceed one-hundredth of an inch in thickness. When a portion of the flocculent matter was placed under an object-glass of about 250 diameters, its cellular structure was seen, well defined, and numerous dark-brown spores bounded most of the cell walls. [See Fig. 1.] In some cases the cells exhibited nothing but dark masses of brown gelatinous matter, but when subjected to pressure and friction they were found to be masses of spores, all of the same class and color. The healthy bark did not exhibit any spores under the same conditions. Fig. 1 represents the general appearance of the cellular matter, spores of the blighted bark in their arrangement, form, and depth of color. I treated blighted pear-tree leaves in a similar manner.

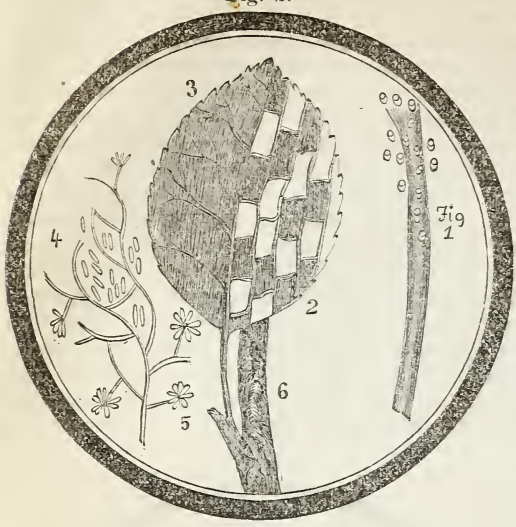
Fig. 1.



On removing a portion of their epidermis to glass microscopic slides, by means of a knife, well-defined elliptical double-celled spores were seen, perfectly developed, under a one-eighth power. Fig. 2 represents the spores on a portion of a leaf-rib, all highly magnified. The cellular structure of the leaf, when viewed under a high power, appeared as at 2. About one-half of the cells were filled with a dark-brown opaque substance, the other half being highly transparent, while 3 shows the appearance of the leaf blackened from internal disorganizations, and 4 represents a single stratum of mycelium which appeared on leaves that had been only partially submerged in water. It had a very fine silken appearance. From its great delicacy it could not be removed from its position, without injury, by any of the ordinary modes, as with a point; and in case spores were present their true positions could not be seen. To overcome this difficulty I prepared a very limpid solution

of copal varnish, by combining one ounce of copal with ten of benzine, a portion of which I poured on a glass slide one inch by three, instantly allowing all the superfluous varnish to drain off. In about thirty minutes after this operation the mildewed leaf was pressed gently on the varnished glass, when the mycelium was transferred to it, owing to the slightly sticky character of the varnish. When mounted in the usual manner they may be photographed. The threads of the mycelium are not more than about the twenty-thousandth of an inch in diameter; from these short threads protrude, on the terminals of which grow bundles of naked spores, arranged as shown.

Fig. 2.



In my investigations of pear-tree blight, I have failed to discover any fungi inhabiting those portions of blighted bark which seem deficient of albuminous matter. The myceliums when once formed, will doubtless spread over substances foreign to them as food; but the protoplasmic portions seem only to foster there the germination of fungi.

There may be periodic times when fruit-trees and cereals will attain great perfection in growth, and appear wholly free from external fungoid disease, notwithstanding the soil, either mechanically or chemically considered, is not of the most favorable character. Such appearances may lead to an extension of fruit-tree planting on such soil; but with a single unfavorable season the fruit-grower's hopes may perish with his trees and labors. Fungi seem ever present, waiting in undeveloped forms their time for action.

Some interesting experiments are being prosecuted by Mr. William Saunders, superintendent of the Department grounds, in relation to pear-tree blight, particularly during the last two years. A pear-tree which was badly blighted on its main trunk was made the subject of special experiment. Nearly all of the bark was blighted within three feet of the ground, only about an inch and a half in width being left to connect the upper part of the tree with the unblighted bark at the base. The affected part was removed and the sap-wood left quite exposed to view; but to prevent injury from the air it was at once coated with a composition of carbolic acid, sulphur, and lime, and largely diluted with water. After the lapse of two years the tree has wholly recovered and the denuded part is again covered with new and healthy bark. The tree in all respects presents a healthy appearance. Many other trees much affected with blight were coated heavily with the sulphur compositions and have evinced marked signs of improvement. It is intended to continue these experiments on a larger scale, until sufficiently numerous and well-established facts attest the best mode of treatment. The Department grounds consist of a heavy, compact, partially undrained

soil, lying low; they are therefore unfavorable for the highest development of pear-tree culture. It has been only by persistent effort that the fruit-trees on the Department grounds have been brought to their present highly improved state.

Barry, on fruit-gardening, says, page 361, that "Blight has never been known to originate on the dry, sandy loam of Long Island, not even with heavy manuring, the drought of mid-summer always ripening the shoots so completely that the leaves drop off long before frost commences." The true source of blight seems to have its origin principally in the action of frost on unripe wood, which may arise from a combination of causes.

The exact conditions of growth, or degree of maturity most favorable to the development of the pear-tree blight or fungi, will form the subject of further investigations, with a view to assist the practical cultivator to counteract, if possible, this troublesome and so frequently fatal disease.

SCIENTIFIC NOTES.

INTERNATIONAL COUNCIL ON THE CATTLE PLAGUE.—Dr. Bouley, an eminent physiologist and veterinarian, who has given special attention to the cattle-plague, has lately made a very important report to the Academy of Sciences of Paris, of the proceedings of the International Sanitary Convention, held March 16 of the present year at Vienna. This had for its special object the determination of the best methods of preventing the cattle-plague, and the taking into consideration the question of establishing proper sanitary regulations in regard to the cattle-traffic between the countries represented in the convention. Delegates were present from eleven states at the convention, namely, Germany, Austro-Hungary, Belgium, France, Great Britain, Italy, the Roumanian Principalities, Russia, Servia, Switzerland, and Turkey.

The delegates included in their number some of the best veterinarians of their respective countries, as also various officers specially charged with the enforcement of sanitary regulations. The questions before the convention, which, by previous notification, they were expected to discuss, were sixty-five, to which a few were added after the sessions commenced. It is a remarkable circumstance, however, that the conclusions arrived at in regard to the regulation of the cattle disease met with almost unanimous approval. This accord was largely due to the fact that there is at present but little contrariety of opinion as to the exotic nature of the disease (at least in regard to Western and Central Europe) and as to its mode of propagation. It was well established in the convention that, outside of Russia, it never develops spontaneously upon any race of cattle, not even that of the steppes; and consequently that, whenever it shows itself outside of its native home, it may be considered as imported.

It is also well established that even after it has continued for a longer or shorter time in any given country, it is only transmitted by contagion, and that it always becomes extinct when the conditions favorable to its propagation cease to exist. The idea, therefore, that the cattle-plague is an epidemic may as well be at once dismissed from every mind. If, however, it is certain that this disease never develops itself spontaneously, beyond the frontiers of Russia, the question still arises as to which of the provinces of that country it properly belongs. This question also

occupied, to a great extent, the attention of the convention, as influencing very largely the rules that were to be adopted.

It is probably in the neighborhood of the Asiatic dependencies of Russia that the evil has its home; but as the precise district has not yet been satisfactorily ascertained, and as the movements of cattle from the Ural Mountains toward the western portion of the Empire very frequently disseminated the contagion in the countries they traversed, it was considered expedient by the convention to leave Russia entirely out of the sanitary agreement, and not to permit the exportation of its cattle except upon certain well-established guarantees.

The subject of inoculation, as a preventive, in Russia, was carefully discussed by the convention; but finally it was concluded that the experiments hitherto made were scarcely sufficient to show a definite measure of beneficial results, and it was agreed that, whatever individual cattle-owners in Russia might prefer to do in the matter, it was not expedient to press upon the governments the enactment of laws on the subject. As to the application of the method to animals of Central and Western Europe, the convention repudiated the idea entirely. The numerous experiments showed that very little impression is made upon the mortality that would naturally have ensued from the disease without such treatment.

As to the general question of absolutely preventing the importation of cattle from Russia, it was found very easy so far as Germany was concerned; but very difficult for Austria and Hungary, owing to the great extent of the coterminous boundaries of the two countries, and the dependence of Austria upon Russia for this source of food. It was, therefore, recommended that a careful supervision should be exercised, and that cattle, after crossing the frontier, should be subjected to quarantine of ten days before resuming their journey.

The question being thus settled in regard to the importation of animals from Russia into Austria, the next point that came up for consideration was the nature of the conditions that the several governments should impose upon themselves toward doing their share to prevent the introduction or spread of the disease; and the measures concluded on as most essential were: first, the immediate slaughtering of all animals that had come in contact with the plague, as also of those which might be considered as under suspicion of having the disease, in consequence of the influences to which they had been exposed, this being accompanied by a proper compensation to the owners; secondly, the burial of the dead bodies of all animals affected with the plague, without attempting to utilize them in any way whatever; thirdly, the utilization of the flesh of sound animals killed under suspicion, but proved after death to have been healthy, this to be permitted only under special conditions rigorously determined; fourthly, the destruction of the germs of the contagion wherever they can be found, in the slaughter-houses, on harness, in pastures, in railway trains, &c., as also the disinfection of all objects with which they have been brought in contact; fifthly, isolation, as complete as possible, of the places where the plague has been found to exist, so that no animal believed to be capable of carrying the contagion or of receiving it shall be allowed to enter the infected districts, this isolation to be put in practice on farms and all other localities, and to be of greater or less extent, according to the extension of the disease; sixthly, the establishment around the places in which the isolation has been ordered, and which have been declared infected, of a zone where the movements of cattle are forbidden, as well as all commerce in anything that may serve as a vehicle of the contagion, such as fodder, dung,

and animal products and materials of every kind; seventhly, the suspension of fairs and movements of cattle in the infected locality and the suspected zone, so that the authorities may have a guarantee that animals have not been moved by clandestine traffic from the place which they originally occupied; eighthly, as soon as a case of plague has been officially established in any locality, an immediate declaration is to be made of every new case, as soon as known, by the keepers of animals; ninthly, after the disappearance of the disease from the localities, suitable precautions and methods of disinfection are to be prescribed preliminary to the re-stocking of the stables and pastures, and the re-establishment of the liberty of trade in cattle.

In all these various measures there is really nothing new. They have heretofore commended themselves to the judgment of those who have had to deal with the subject. Another, however, of great importance in a commercial and sanitary point of view, was added, namely, the requirement that every State in which the cattle disease manifests itself shall make announcement of the fact immediately, by telegraph, first to the neighboring governments, and ultimately to those more distant. A careful inquiry is to be made as to the route of introduction and propagation of the disease, and the results are to be, with the least possible delay, brought to the knowledge of the authorities of all the countries menaced by the invasion of the plague. Wherever the disease has actually broken out in a country, it is to publish in an official journal, a weekly bulletin showing the stage of the disease, the measures adopted for its prevention, the successive modifications of regulations which are to be introduced according to circumstances, and, finally, the day in which they cease to be in operation; this bulletin to be sent to the editors of official journals of other States when they desire it.

The convention found that, among the various countries that had had occasion to take measures for the proper disinfection of cattle-cars and other vehicles of transportation, Germany had the most satisfactory arrangements. Here, after a train has been emptied of its contents, the cars are immediately deluged with warm water of at least 160° F. The shock and strength of the current, falling from a considerable elevation, detaches all organic material adhering to the wood-work, and, by the elevation of temperature, annihilates all virulent activity.

The principal point established by the convention, according to Bouley, was the necessity of an obligation to slaughter all animals as soon as the disease made itself manifest, or as soon as there seemed a probability that an animal would be attacked. In this way the plague will be arrested by sacrifice of the smallest number of animals.

Source of nitrogen in the soil.—According to Deherain, the sources of the nitrogen of the soil, as at present recognized, are insufficient to account for the amount of nitrogen which the soils contain, and he tries to prove, by certain experiments, that the free nitrogen of the atmosphere is brought into combination during the oxidation of the organic matter of the soil.

Cure of enteritis in horses.—Dr. Mooer, a veterinary surgeon in London, has, it is said, been very successful in curing enteritis in the horse, by administering morphia in conjunction with chloroform. He first introduces a full dose of morphia subcutaneously, and if the severe and violent pain is not relieved in a few hours, he casts the horse and administers chloroform by inhalation. He has succeeded in producing profound, unbroken sleep in seven or eight hours, by the use of one ounce of chloroform, the patient waking at the end of that time quite convalescent.

MICROSCOPIC FORMS IN CHICAGO WATER.—Mr. Babcock, of Chicago, has contributed an interesting article to the "Lens," upon the effect on the hydrant water of the reversal of the current of the Chicago River. It is well known that during the past year an engineering enterprise of much magnitude, initiated some time since, was completed, namely, the connecting of the Chicago River with a tributary of the Mississippi, by which its stagnant waters were carried southward toward the Gulf of Mexico, and their place supplied by a continuous stream of pure water from the lake.

One desired effect of this enterprise, namely, an improved sanitary condition of Chicago, was speedily accomplished; and not only did the effluvium from the river measurably diminish, but the hydrant-water has been greatly improved in purity. The shaft through which water is admitted to the tunnel from the water-works is situated in the lake, some two miles from the shore, and although so far removed from the drainage of the city, more or less of impurity continually found its way into its mouth. This was proved both by chemical and microscopical examinations, numerous forms of infusorial objects, such as diatoms, vegetable and animal germs, &c., being readily discernible. Somewhat to the inconvenience of microscopists, the new arrangement has tended to reduce the number of such objects very materially, so that the water sometimes scarcely repays the labor of searching for microscopical material.

Mr. Babcock is inclined to believe that so long as a moderately rapid current is kept up in the Chicago River from the lake, the city will be provided with water nearly equal in purity to that at Mackinaw, which has become proverbial for its excellence.

PECULIARITIES OF THE PAST WINTER IN EUROPE.—The past winter has been a very remarkable one in England. The cold weather set in unusually early and severely with the commencement of November, and from that date to December 13, Mr. Glaisher's weekly tables of meteorological observations, taken at Greenwich, show the temperature to have been uniformly below the mean of the last fifty years, with the break of only a single day, the mean depression for the whole period being 6° 5′ Fahrenheit. The coldest day was December 8, when the thermometer fell to 18° 6′ Fahrenheit, and the temperature of the twenty-four hours was 19° 3′ below the mean. Throughout France the month of November was very severe, the mean temperature of the month having been lower only four times during the last century. According to statistics presented to the Academy of Science by M. Ch. Sainte-Claire Deville, the thermometer fell as low as 11° Fahrenheit at Montargis on December 3, while even at Marseilles the remarkably low temperature (for that locality) of 27° 5′ Fahrenheit is recorded on November 23. During the early part of December the frost continued still more severe in France and Italy, where much snow fell. At Rome and throughout France trees and shrubs which had survived many winters were entirely destroyed. M. Delaunay remarks that the cold advanced, as is usually the case, from northeast to southwest. The minimum temperatures were recorded at Groningen, in Holland, on December 7, 14° Fahrenheit; at Brussels, 9° 5′ Fahrenheit on the 8th; and at Paris, 6° Fahrenheit on the 9th. This extremely low temperature appears to have been confined to a very limited tract of country between Paris and Charleville. On the same day the temperature was above the freezing point in Scotland, within reach of the influence of the Gulf stream, as far north as Nairn, and in the greater part of Eng-

land, falling only at Greenwich as low as 28° Fahrenheit. This severe frost was followed in England by a period of exceptionally mild weather of probably unprecedented length. For ninety-seven days, from December 13 to March 18, Mr. Glaisher's tables show that the temperature was above the average on eighty-nine, and below the average on only eight days, the mean excess for the whole period being 5° 1 Fahrenheit. During the whole of this period of more than three months the thermometer fell below the freezing point on four nights only, February being entirely free from frost. The warmest period was from March 1 to 8, when the maximum temperature ranged each day from 57° 1′ to 60° 8′.

On March 19, the temperature again fell below the mean, and continued so for nine days, till the 27th, accompanied in London and the neighborhood by heavy falls of snow. The minimum temperature for March was, on the 21st, 26° 2′, being the lowest recorded since December 9. There were nine frosty nights in March, against two in the whole of the two preceding months. For the week ending March 26, the mean temperature was 34° Fahrenheit, or 16° lower than the mean for the week ending March 7. The severe frost of March 21, following such a long period of mild weather, has done an immense amount of damage to the fruit crops, the pears and cherries having suffered more severely. It is remarkable that, although the flowers were killed in the bud, the center being turned perfectly black, they opened as if untouched, and presented a mass of bloom looking to the eye entirely uninjured. On the early vegetable the effects were no less disastrous. In the island of Jersey alone, whence large supplies are usually obtained for the London market, the damage to the potato crop is estimated at many thousands of pounds.

Influence of variously colored light on vegetation.—As the result of a series of experiments upon the influence of variously colored light upon vegetation, Dr. Bert has arrived at the following conclusions: 1. That green light is almost as fatal to vegetation as darkness. 2. That red light is very detrimental to plants, though in a less degree than green light. 3. That though yellow light is far less detrimental than the preceding, it is more injurious than blue light. 4. That all the colors taken singly are injurious to plants, and that their union in the proportion to form white light is necessary for healthy growth.

The author has examined the transmitted light from the leaves of various plants, and finds that there is a slight difference in the rays which different leaves absorb and utilize; and this, he believes, explains the fact that certain plants flourish in the shade of trees, while others will scarcely exist; in the former case it is supposed that the rays required by the plant are not absorbed by the leaves of the trees, but in the latter they are.

Physiology of Grafting.—Mr. Gœppert, in Silesia, gives results of some observations in reference to tree-grafting, substantially as follows: Upon the vertical surface of the stock a tissue of parenchyma is developed, proceeding from the medullary rays, which enters into intimate connection with that of the scion. At the same time the cambium of the scion unites perfectly with that of the stock. The place of this union remains visible, and is named by Mr. Gœppert the line of demarkation. All development above this line belongs to the scion, all below to the stock. The stock, entirely deprived of leaves, furnishes, as it were, the crude sap to the scion, which by its organs of vegetation assimilates it. But as soon as the descending sap has passed the line

of demarkation it assumes again all the peculiarities due to the nature of the stock, and as no leaves are allowed on the stock to elaborate the sap it appears that the thin stratum of tissue formed at the connection is the only means of producing this change and thus retaining the characteristic distinctions of scion and stock. Such mutual independence is also often seen in the difference in growth, the stock frequently surpassing the scion, and inversely.

THE NUMBER OF EGGS FROM A HEN.—A German naturalist answers the question how many eggs a hen can possibly lay, as follows: The ovary of a hen contains about six hundred embryo eggs, of which, in the first year, not more than twenty are matured. The second year produces one hundred and twenty; the third, one hundred and thirty-five; the fourth, one hundred and fourteen; and in the following four years the number decreases by twenty yearly. In the ninth year only ten eggs can be expected, and thus it appears that after the first four years hens cease to be profitable as layers.

AMOUNT AND ORIGIN OF MINERAL MATTER IN PLANTS.—Baudrimont, in the course of an examination into the amount of mineral matter in plants, determined the composition of quite a number of species, and arrived at the following conclusions: First, that mineral matter is found in all plants, even in those of aerial growth, which would scarcely seem likely to have the power of acquiring it; second, that the mineral matter contained in plants occurs in at least two distinct conditions, namely, as a simple solution in the vegetable juices, either not having been yet utilized or unassimilable as the product of dejection, or else as finally united to or fixed with organic matter; third, this latter mode of union may occur in variable proportions, from the smallest quantity indispensable to the production of organic matter to a maximum, where the reciprocal action becomes zero.

The variability of the relative proportion of the organic mineral matter shows that these are not united to each other, as the fundamental chemical elements are united. In place of an intimate combination in definite proportions between the elements of molecules, there is only a simple adhesive union, with the preservation of the fundamental structure of organic products.

Baudrimont was much struck by finding that *Cactus peruvianus* contained 94 per cent. of water and volatile matter, and .04 per cent. of organic matter; and, therefore, that .05 per cent. of organic mineral matter was sufficient to give this plant a definite form, and a texture which enables it to resist atmospheric agencies.

PROPERTIES OF EUCALYPTUS.—An elaborate essay upon the *Eucalyptus* appears in the October number for 1871 of the Bulletin of the Acclimation Society of Paris, as prepared by M. Raveret-Wattel. In this the merits of the tree for many purposes are detailed at length.

UTILIZATION OF SUINT.—In nothing is the spirit of the age more clearly shown than in the efforts made to utilize waste substances. This is being done with such effect that what was formerly got rid of with great difficulty and at considerable expense may become one of the most important objects of manufacture. We need only point to such matters as sewage, the slag of furnaces, the fine coal of commerce, the waste of pyrites used in the manufacture of sulphuric acid, &c., as illustrations. Quite a recent instance of this improved economy is found in the treatment of the wool of sheep. It has been ascertained that sheep derive from the soil upon which they pasture a considerable

amount of potash, which, after it has circulated in the blood, is excreted from the skin with the sweat, and remains, generally in connection with this, attached to the wool. Chevreuil discovered, some time ago, that this peculiar mixture, known by the French as suint, constitutes not less than one-third the weight of the raw merino fleece, from which it is easily removed by immersion in cold water. In ordinary wools the suint is less, the amount being about 15 per cent. of the raw fleece. Formerly it was considered as a kind of soap, mainly for the reason that the wool, besides this, sometimes contained about 8 per cent., or a not inconsiderable quantity of fat. This fat, however, is usually combined with earthy matters, mostly with lime, and consequently forms a soap which is very insoluble. The soluble suint is a neutral salt arising from the combination of potash with a peculiar animal acid, of which little more is known than that it contains saltpeter. Special effort has lately been directed to suint, in order to obtain as much as possible of the potash eliminated from the animal, and a special industry has been established at various portions of the great French wool district, such as Rheims, El Bœuf, &c.

A company purchases from the wool-raisers the solution of the suint obtained by rinsing the wool in cold water; the price paid for it being higher in proportion as it is more concentrated. As a general thing it is maintained that a fleece weighing nine pounds contains about twenty ounces of suint; which should contain about one-third part, or six to seven ounces of potash, although not more than five and one-half ounces are perhaps directly available.

In the wool manufactories of the towns just referred to there are nearly 60,000,000 pounds of wool washed annually, the yield of about 6,750,000 sheep. This quantity should contain over 3,000,000 pounds of pure potash. Thus, the water in which the wool is washed, and which has been heretofore thrown away, is made to yield a product, adding appreciably to the value of the wool itself, and more than covering the cost of its treatment. It is, of course, not an easy matter to utilize this solution of suint on a small scale; but wherever the work is carried on by the wholesale, as it is in connection with all great manufacturing establishments, it will undoubtedly become a regular part of the process of manufacture.

Preventing heating in grain-stacks.—A simple instrument has lately been devised, under the name of the Hay-stack Ventilator, for the purpose of ascertaining and counteracting the heating in the interior of stacks of hay or grain. This consists of a wrought-iron tube, about 3 inches in diameter, which is long enough to reach into the middle of the stack, and, like the Norton well-tube, is provided with a conical point at the tip, and pierced for about two-thirds its length with numerous holes. A screw arrangement is affixed to the posterior extremity, by which it can be connected with an accompanying discharge-pipe.

For use this apparatus is to be driven horizontally into the stack to be investigated, either by means of a mallet or by a screw arrangement, and the temperature ascertained after a short interval by introducing a self-registering thermometer. Should the temperature be too high at any point in the stack, a tin tube is to be affixed vertically to the outer end of the iron tube, and an outward current of air from the interior of the stack produced, by means of which the heat is speedily carried off without any injury to the stack. Hooks may be attached to the tip of the instrument, by which small samples of the central part of the stack can be brought out.

FERMENT FUNGI.—Dr. Engel, of Strasburgh, has ascertained that alcoholic fermentations is accompanied by the development of two different genera of fungous plants, while that of fruits embraces four kinds. These latter ferments are found almost always on the surface of the fruit, where they remain in a latent condition without development. When, however, the epidermis becomes cracked, or when the stem of the fruit is separated, the ferment (or its spores) comes into contact with the sacharine juices, and the ferment is then reproduced, but always in the form of ferment and never in that of mold. Engel maintains that the alcholic ferment exists in nature, although the fact has been denied by others. Thus, as long as a cherry is intact it has a particular savor; when, however, the stem is detached or the epidermis is cracked, the cherry not only changes its color, but assumes a vinous taste, and exhibits a large number of fermented cellules.

He also remarks that the ferment of bread is of a different species from the yeast of beer, and that he has never been able to germinate the spores of ferments in vegetables which contained but little sugar, or none at all; but that as soon as they come in contact with sacharine liquid they germinate or reproduce the ferment.

DESTROYING CATERPILLARS.—According to Schmidt, an excellent remedy against caterpillars consists in a dilute solution (1 part in 500) of sulphide of potassium, the infested tree being sprinkled with this substance by means of a small hand-syringe. This method has been used on a large scale in Southern France, and, it is said, without any injury to vegetation.

CHROMIC ACID AS AN ANTISEPTIC.—Dr. Dougall states that chromic acid, as an antiseptic, is far beyond carbolic acid, and, in fact, may be considered as standing at the very head of the list. In one instance an ounce of ox muscle was immersed for twenty-four hours in a solution of one part of chromic acid in 2,000 of water, and then suspended in the air. At the end of six days it became as hard as wood, in which condition it remained three months without mold or taint. The same quantity of ox muscle was soaked twenty-four hours in a solution of one part carbolic acid in 1,000 of water, and then suspended in the air, and at the end of six days it was much hardened, colored brownish black, speckled with mold, and distinctly tainted. Its action as an antiseptic consists in coagulating the protein compounds, a property which it possesses in the highest degree; and its power of coagulating the albuminous cells is ten times that of carbolic acid, twenty times that of bichloride of mercury, and one hundred and fifty times that of chloralum. It also coagulates, hardens, and oxidizes decomposing organic matter, and when added to putrid flesh, urine, or fœcal matter, the offensive odor is soon absolutely removed, the mixture remaining fresh for an indefinite time.

ORIGIN OF MALARIA.—Mr. Daniel Vaughan, of Cincinnati, contends that malaria results primarily from the volatile oils of plants, which become evaporated from their surfaces and are carried into the atmosphere. If these were uniformly diffused, he thinks they would produce little injury, but being carried from the high grounds into the moist, damp, low lands, they become accumulated in an excessive degree, and produce the evils referred to. He does not suppose that all the volatile oils have the same effect on human life, some, probably, being much more potent than others; but he thinks that this question can only be settled by observation and experiment.

POLLUTION IN WATER.—A bill in reference to public health has been brought before the British Parliament, with a strong probability of its becoming a law, embracing, as it does, the recommendation of the Royal Sanitary Commission, which has been engaged for some time past in suggesting points for legislation. The principal part of the enactments have reference to the pollution of water by the discharge of refuse animal, solid or liquid, matters into it; and as it may be of interest to our readers to know what the highest sanitary authorities in England consider as "pollutions" of water, we append their definitions of the same as given by the act.

1. Any liquid containing in suspension more than three parts, by weight, of dry mineral matter, or one part by weight of dry organic matter in 100,000 parts, by weight, of the liquid; or,
2. Any liquid containing in solution more than two parts, by weight, of organic carbon, or .03 by weight of organic nitrogen, in 100,000 parts, by weight, of the liquid; or,
3. Any liquid which exhibits by daylight a distinct color, when a stratum of it one inch deep is placed in a white porcelain or earthenware vessel; or,
4. Any liquid which contains in solution, in 100,000 parts by weight, more than two parts by weight of any metal, except calcium, magnesium, potassium, and sodium; or,
5. Any liquid which, in 100,000 parts by weight, contains, whether in solution or suspension, in chemical combination or otherwise, more than .05 part by weight of metallic arsenic; or,
6. Any liquid which, after acidification, with sulphuric acid, contains, in 100,000 parts by weight, more than one part by weight of free chlorine; or,
7. Any liquid which contains, in 100,000 parts by weight, more than one part by weight of sulphur, in the condition either of sulphuretted hydrogen, or of a soluble sulphuret; or,
8. Any liquid possessing an acidity greater than that which is produced by adding two parts by weight of real muriatic acid to 1,000 parts by weight of distilled water; or,
9. Any liquid possessing an alkalinity greater than that produced by adding one part, by weight, of dry caustic soda to 1,000 parts, by weight, of distilled water.

FUNCTION OF POTASSIUM IN SOILS.—According to Nobbé, the presence of potassium in soils is necessary in order to enable the chlorophyll grains of the leaves to form starch; sodium and lithium being unable to replace potassium in this function, the latter indeed being actually injurious. He has also ascertained that the different combinations of potassium vary very much in their value, the chloride being by far the most efficacious.

PREVENTING SOWS FROM DEVOURING THEIR YOUNG.—It is well known that sows not unfrequently attack and devour their own young; or if prevented from this, will not let down their milk, so that the young pigs necessarily die for want of nourishment. When this state of things is not caused by a diseased condition of the uterus, it is said that the sow can be brought to terms by pouring a mixture of ten to twenty grains of spirits of camphor, with one to three of tincture of opium, into the ear. The sow will immediately lie down on the side of the ear to which the application was made, and remain quiet for several hours in this position without interfering with her pigs; and on recovery from the stupor will have lost her irritability in regard to them. The experiment has been tried in Germany hundreds of times, according to one of the agricultural journals, without any injurious effects. It is also said that the eating of pigs by the parent sow can be readily prevented by rubbing them all over with brandy, and making the same application about the nose of the sow herself.

FACTS FROM VARIOUS SOURCES.

HOPS.—E. F. Lewis, secretary of the agricultural society at Lenox, New York, writes: "Hops are in demand at a high figure, the extreme prices of last year encouraging farmers to increased acreage."

The San Joaquin Farmers' Club, at Stockton, California, has advertised for two thousand hands for the wheat harvest, to supply a deficiency of laborers occasioned by the great increase of acreage planted this season in the San Joaquin Valley. A scarcity of permanent farm-labor in that region is reported.

WHEAT AND CHINCH-BUGS.—Isaac Colburn, secretary of the Farmers' Club at Loami, Sangamon County, Illinois, reports the prevalence of chinch-bugs before the first of May, and gives a glowing account of wheat prospects.

ANGORA GOATS IN UTAH.—A co-operative company formed through the efforts of J. E. Johnson, editor of the Utah Pomologist, arranged for the importation of 130 Angora and Thibet goats, and succeeded in obtaining 108, a portion being lost in a severe storm on the Union Pacific Railroad. These are in good condition, and are intended for crossing with the common goat.

IMPORTATION OF SUGAR-CANE.—Mr. Peter M. Lapice, of New Orleans, is on his way to India, by way of the isthmus of Suez, with the intention of procuring from the islands of Sumatra, Java, and Prince of Wales, specimens of the best Java ribbon-cane, and other popular varieties, for cultivation by himself and other planters in Louisiana, several of whom have joined in a contribution of $5,000 toward defraying the expenses of the importation.

INJURY BY FROST.—The Grape-growers' Association of Napa, Solano and Sonoma Counties, California, at a recent meeting, discussed the injury done to vineyards by late severe frosts, and the proper treatment of the injured vine. They concluded that the first accounts of the injury done were highly exaggerated. The loss to the Buena Vista vineyard in Sonora is placed at $25,000, and other vineyards have suffered losses of $10,000 to $15,000 each; but through the entire valley it is thought that the damage will not exceed one-fifth of the crop. With regard to treatment, the plan of pulling off the whole frosted shoot was rejected, on the ground that the dormant buds, near those shoots, on last year's wood, would thereby be injured or lost. Leading grape-men proposed to cut off only the injured part, retaining one or two sound buds, if the frost had left such, nearest the old wood.

CALIFORNIA RAISINS.—Several grape-growers in California have succeeded in producing raisins of fine quality. Messrs. Wadsworth & Butterfield, from their vineyard on the foot-hills near Nevada City, have produced, from 450 pounds of grapes, 150 pounds of raisins of superior flavor, claimed to be equal to the best Malaga, and worth 24 cents per pound. This furnishes a fine margin for profit, as it secures 8 cents per pound for grapes, which is a very remunerative figure in California.

SUGAR IN SAINT MARY'S PARISH, LOUISIANA.—It is reported that Mr. Etienne Maynard, who, after the war, began without a dollar, and with one row of seed-cane in a garden, made, the second year, 41 hogsheads of sugar; and now, as the fruit of that small beginning, owns a plantation fully stocked, and worth at least $25,000. The secrets of Mr. Maynard's success are industry, economy, and good implements.

SOUTHERN CALIFORNIA.—Mr. O. Traver reports a new settlement in Santa Anna Valley, San Bernardino County, Southern California, at a location fifty miles east of the Pacific, and 1,000 feet above its level. It is less than eighteen months old, and contains about sixty families, of industrious, enterprising habits, chiefly from States in the valley of the Mississippi. They are on lands lying along and from 60 to 100 feet above the level of the Santa Anna River; from which, for purposes of irrigation, they have constructed an aqueduct nine miles in length. Last autumn, corn ripened planted as late as the 1st, and beans as late as the 23d of August. A large area of wheat and barley, sown after the 20th of December, promises a good yield; and these grains will be harvested in season for a crop of corn or vegetables on the same ground. Strawberries, unprotected, were ripe the latter part of March. The location is described as very healthy, and the climate and soil as favorable for the raisin-grape and tropical fruits. For the first half of March the average temperature was, at 7 a. m., 47°; at 2 p. m., 73°; at 6 p. m., 60°: maximum, 82°; minimum, 32°; and when at the latter point, it is remarked as a peculiarity of the climate, that corn and beans were slightly, if at all, injured.

EFFECT OF SNOW ON THE TEMPERATURE OF THE SOIL BENEATH IT.—Mr. C. G. Prindle, of Chittenden County, Vermont, has made an experiment designed to ascertain how far soil is protected from cold by snow. For four successive winter days, there being four inches of snow on a level, he found the average temperature immediately above the snow 13° below zero; immediately beneath, 19° above zero; under a drift two feet deep, 27° above zero.

A LARGE WHEAT FIELD.—It is claimed that a farmer named Mitchell in the San Joaquin Valley, California, is the largest wheat-grower in the United States. Early in March he had planted 36,000 acres, and expected to make the amount over 40,000 by the middle of that month. At 15 bushels per acre, which may not be too high an estimate for this year, this would give a crop of 600,000 bushels, and that, at 60 cents per bushel—not a high estimate—would bring $360,000. The average expense of planting and harvesting wheat in that region is estimated at $4 per acre, which would leave a clear profit of $200,000.

ORANGES IN CALIFORNIA.—It is reported that the crop of oranges in San Bernardino County is estimated by good judges as five times larger than last year's crop, and that about 5,000,000 oranges had been shipped as early as the 1st of May, at prices averaging about $25 per thousand.

THE OHIO STATE FAIR FOR 1872 will be held at Mansfield, Richland County, September 2 to 6. Persons wishing to exhibit are referred to Mr. John H. Klippart, corresponding secretary State board of agriculture, Columbus, Ohio.

SUGAR-CULTURE IN LOUISIANA.—It is reported that on the Porche plantation, in the parish of Terrebonne, Mr. Champagne made in 1871 172 hogsheads of sugar, weighing 226,113 pounds, and 192 barrels of molasses. The sugar sold for $17,708, equal to $7\frac{9}{10}$ cents per pound; the molasses for $2,853: total, $20,561. The cost of production is estimated at $11,454, leaving as net profits $9,107. If we deduct the value of the molasses from the whole cost, it leaves, as the cost of the sugar, $8,601, equal to $3\frac{8}{10}$ cents per pound, leaving a profit of $4\frac{1}{10}$ cents per pound.

CORN FODDER.—Mr. Alexander Reed, of Lockhaven, Clinton County Pennsylvania, reports that his practice is to cut up his corn as late as he can, and avoid frost. After husking, the stacks are bound and carefully shocked till cured, then stowed in barn. They are prepared for feed as follows: Each morning and evening the quantity needed for one feeding is cut with a "power-cutter," put in a tight box with a mixture of meal and bran sprinkled in; boiling water is then poured on, and the box closed with a tight lid, so as to shut in both heat and steam. That steamed at night is warm when fed in the morning, and that in the morning when fed in the afternoon. Mr. Reed states that, prepared in this way, the cows eat all the butts, and a ton will produce more and much better milk for butter than a ton of the best hay prepared in the same way.

BREEDS OF FARM ANIMALS FOR HILLY REGIONS.—Mr. W. S. Rand, of Lewis County, Kentucky, gives the results of his experience in raising cattle and sheep in different localities. In 1860 he removed from Mason County, which is comparatively level and of a limestone soil, to Lewis County, which is mountainous and its soil a sandy loam. In the latter he found the poorer grazing compensated for, in part, by the beneficial effects of pure, soft, running water, as contrasted with the deleterious effects of the hard and still water of the former. Finding in the county no other than small native stock, he procured a large short-horn bull, of pure blood. The result was that nearly all the native cows put to him needed assistance in calving, and in many cases both cow and calf perished. Moreover, the bull proved to be too heavy and clumsy for grazing on a mountainous region, and finally died in consequence of falls and sprains. A large, short-horn cow met with a similar fate. Mr. Rand observed that the light Alderneys, and especially the light and nimble Devons, requiring less food and less traveling, as well as having less weight to carry about, would satisfy their wants by feeding a few hours, and then lie down and ruminate as long. Alternating in this way through the day, at its close they would be plump and unwearied, whereas the heavier cattle, having to toil and climb all day in ineffectual endeavors to satisfy their larger wants, would look gaunt and wearied out. His conclusion is, that the smaller and nimbler species, particularly the red Devons, are the most profitable for mountainous grazing, while the short-horns and kindred species are more desirable for fertile plains. He had a somewhat similar experience with sheep. With a view to improve the mutton and wool-bearing and fattening qualities of the very small but hardy, fleet native sheep in the county, he crossed them with South Downs with very satisfactory results. But an attempt to cross this improved grade with Cotswolds resulted in the same difficulty that occurred in crossing large with small cattle. The lamb, at the time of birth, was so large that in many cases both it and its dam perished. He claims, however, to have succeeded in breeding a flock of mixed blood, in which the best qualities of the South Downs, the Cotswolds, and the natives are united.

TEA-GROWING IN INDIA.—The experiment of growing tea in India is proving quite successful. In 1862 the crop was estimated at 1,000,000 pounds; in 1871 at something over 20,000,000. It is claimed that India can now compete with China in producing teas of the best quality.

AMERICAN PLANTS IN ENGLAND.—The director of the royal gardens at Kew, England, reports as received from this country in 1871, 353 packages of seeds, 103 green-house and 52 herbaceous plants, and 19 trees and shrubs.

CINCHONA.—It is claimed that a new variety of cinchona tree, of superior value, has been originated in India. Recently plants, eight feet high, of the new, and of the common species, raised on the Neilgherry plantations, were analyzed, with the following results: The new yielded of quinine, 7 parts; of alkaloid, 11.50; the common, of quinine, 2.42; of alkaloid, 4.52.

PERCENTAGE OF CREAM AS AFFECTED BY TEMPERATURE.—Mr. C. Schermerhorn, supervisor of a cheese-factory at Derbyshire, England, took a certain quantity of average milk—dipping it from vats in which milk was mixed—and set it in a cream-gauge daily from April 1 to October 31. For April the average percentage of cream was 10.66; May, 9.931; June, 8.75; July, 8.253; August, 9.12; September, 10.875; October, 12.49. It will be observed that the average of cream diminished as the average temperature rose, and *vice versa*. Mr. Schermerhorn also found like results attending the daily rise and fall of the thermometer, the hottest days yielding the smallest percentage of cream.

NEW ZEALAND FLAX.—Mr. A. Carr, of Carbondale, Pennsylvania, who for some years resided in New Zealand and gave special attention to the variety of flax cultivated in that island, thinks it could be profitably produced in this country. The dressed fiber commands the present year in the English market £25 per ton, and in New York 9 cents per pound in gold. It can be used as a substitute in all products manufactured from the common variety, as linen, cordage, paper, &c., and is extensively used for stuffing chairs, mattresses, &c., being as suitable and durable for that purpose as horse-hair.

DIVERSITY IN SOUTHERN INDUSTRY.—The corresponding secretary of the Pioneer Agricultural Society of Halifax, North Carolina, observes that the practice of raising large cotton crops to the neglect of other farm products sufficiently accounts for the extensive wastes which so frequently meet the eye, covered with second growth pines and cut up by gullies. He states that the people are waking up to this fact, and, so far as their shattered resources admit, are beginning to practice mixed husbandry and rotation in crops. With reference to the same subject, Mr. E. A. Crandall, of Oxford, Alabama, writes:

> We are wounded and bruised, and must have mollifying ointment to effect a cure; this of the tiller as well as of the soil. Not at once can it be expected of us, but gradually it is to be hoped we may be induced to work ourselves into that more enlightened and rational path, embracing all the various branches of industry and leading to better methods, wherein lies more certain success, not for the South only, but equally for our whole, unsectional, undivided country.

Mr. Richard H. Day, of Baton Rouge, Louisiana, writes:

> The South wants labor, capital, and diversified industry. The latter will eventually bring the two former. Heretofore the cultivation of cane and cotton have monopolized the entire attention of our people. The folly of the system is beginning to be understood, and other crops are being cultivated. It is now demonstrated that in this latitude apples, pears, peaches, and, indeed, almost any fruit, can be successfully raised. With proper attention good crops of corn may be raised. I have been raising corn on a few acres consecutively since 1837, and every year increasing the yield without commercial fertilizers. This year the yield was over one hundred bushels to the acre.

Mr. H. Tatwiler, of Havana, Alabama, thinks that the salvation of the South depends largely on the introduction of cereals and grasses. "It will take time for our planters to get over their antipathy to grass—a thing they have been fighting all their lives; but nothing else will meet our deficient supply of labor."

COST OF LABOR IN THE SOUTH.—Mr. H. Hammond, of Augusta, Georgia, writes:

We feel more and more the need of information as the problems set before us by the emancipation of our laborers continue to widen. * * We cannot understand how it is that, with a soil and climate producing crops that give a much larger money-yield per acre than in the Northern and Western States, we are not able to pay one-fourth the wages to labor that are paid there; unless it be that a laborer does more there than he does here. We, therefore, feel a great interest in knowing the cost of the various sorts of farm work, by the piece, in the different sections; *e. g.*, daily wages being $1, what does it cost to break up, broadcast, an acre of ground; to plant an acre of wheat; to build 100 feet of fence; to lay off an acre of corn; to cut an acre of grass, &c., &c.

IMPROVED QUALITY OF COTTON.—The correspondent above quoted says:

We believe that our cotton-seeds might be greatly improved by a system of budding and hybridizing the varieties of this plant where it could be scientifically conducted for a length of time, as it might be under glass; and we believe that the southern cotton-planter must rely more and more on the excellence of the staple he produces to overcome competition from other countries.

MARKET PRICES OF FARM PRODUCTS.

Articles.	May.	June.
NEW YORK.		
Flour, superfine, State.....per barrel..	$6 50 to $6 90	$6 00 to $6 50
extra, State.....do.....	7 10 to 8 00	7 00 to 7 90
superfine western.....do.....	6 50 to 6 90	6 00 to 6 50
extra to choice western.....do.....	7 00 to 12 00	6 95 to 12 00
extra southern.....do.....	8 00 to 9 75	8 25 to 10 75
good to choice southern.....do.....	9 00 to 12 25	10 80 to 13 00
Wheat, No. 1 spring.....per bushel..	1 65 to 1 66	1 74 to 1 76
No. 2 spring.....do.....	1 59 to 1 64½	1 68 to 1 71
winter, red, western.....do.....	1 80 to 1 84	1 90 to 2 00
amber, western.....do.....	1 87 to 1 92½	2 05 to 2 08
white, western.....do.....	1 88 to 2 05	2 00 to 2 12
Rye.....do.....	92 to ———	95 to 96
Barley.....do.....	67½ to ———	1 05 to 1 06
Oats.....do.....	52½ to 56	54 to 56
Corn.....do.....	71½ to 74	68 to 72½
Hay, shipping qualities.....per ton...	29 00 to 30 00	32 00 to 38 00
prime.....do.....	31 00 to 36 00	34 00 to 38 00
Pork, mess.....per barrel..	13 60 to 13 75	13 00 to 13 25
prime.....do.....	11 25 to ———	10 50 to 10 75
Beef, plain mess.....do.....	8 00 to 9 50	8 00 to 9 50
extra mess.....do.....	10 00 to 12 00	10 00 to 12 00
Lard.....per pound..	8¾ to 9⅜	8¾ to 9⅝
Butter, western.....do.....	20 to 25	15 to 25
State dairy.....do.....	30 to 31	27 to 30
Cheese, western dairy.....do.....	14 to 17	10 to 13
State factory.....do.....	15 to 17½	13 to 14⅝
Cotton, ordinary to good ordinary....do.....	20 to 22¾	20¾ to 23⅞
low middling to good middli'g.do.....	23 to 25	25½ to 27⅜
Tobacco, lugs, all grades.....do.....	8 to 9¼	8¼ to 9½
common to medium leaf....do.....	9 to 10¾	9 to 10¼
Wool, pulled.....do.....	78 to ———	70 to 82
tub-washed.....do.....	90 to ———	.....
California, spring clip.....do.....	.....	.....
fall clip.....do.....	37½ to ———	30 to ———
Texas, inferior to common.....do.....	.....	.....
BOSTON.		
Flour, western, superfine.....per barrel..	6 50 to ———	6 50 to ———
extras.....do.....	7 25 to 8 50	7 25 to 8 50

Market prices of farm products—Continued.

Articles.	May.	June.
BOSTON—Continued.		
Flour, western, choice ..... per barrel..	$9 50 to $12 50	$9 50 to $13 00
southern extras ..... do.....	7 25 to 7 50	7 25 to 7 50
choice Baltimore ..... do.....	10 00 to 12 50	10 00 to 13 00
Wheat ..... per bushel..	1 75 to 2 10	1 75 to 2 10
Rye ..... do.....	92 to 95	92 to 95
Barley ..... do.....	75 to 1 20	75 to 1 20
Corn, southern yellow ..... do.....	77 to 77½	76 to 77
western mixed ..... do.....	75 to 76	74 to 76
western yellow ..... do.....	76½ to 77½	76 to 77½
Beef, mess ..... per barrel..	10 00 to 12 00	10 00 to 12 00
extra ..... do.....	12 00 to 16 00	12 00 to 16 00
Pork, prime ..... do.....	11 50 to 12 50	11 50 to 12 50
mess ..... do.....	14 25 to 14 50	14 25 to 14 75
Lard ..... per pound..	9¼ to 9½	9⅓ to 10
Butter, New York and Vermont ..... do.....	15 to 31	18 to 30
Canada, good to choice ..... do.....	25 to 30	25 to 29
western ..... do.....	12 to 28	12 to 27
Cheese, N. Y. and Vt., choice factory .. do.....	17 to 17½	13 to 14
Ohio choice factory ..... do.....	16½ to 17	13 to 14
Hay ..... per ton...	32 00 to 38 00	35 00 to 41 00
Wool, Ohio and Pennsylvania ..... per pound..	75 to 85	68 to 78
Michigan ..... do.....	75 to 80	65 to 73
other western ..... do.....	73 to 78	65 to 72½
California ..... do.....	35 to 55	30 to 60
Texas ..... do.....	35 to 50	35 to 50
combing-fleece ..... do.....	90 to 95	88 to 90
PHILADELPHIA.		
Flour, superfine ..... per barrel..	5 50 to 6 50	6 00 to 6 75
extras ..... do.....	6 75 to 7 50	7 25 to 7 75
family and fancy brands ..... do.....	8 00 to 11 00	9 50 to 11 50
Wheat, red, Penn. and western .... per bushel..	2 05 to 2 08	2 10 to 2 15
amber ..... do.....	.....	2 20 to 2 25
Rye ..... do.....	1 00 to ———	1 10 to ———
Corn, yellow ..... do.....	72 to ———	69 to 70
mixed, western ..... do.....	72 to ———	69 to 70
Oats, western white ..... do.....	54 to 55	59 to 69
Pork, mess ..... per barrel..	13 75 to 14 00	14 00 to 14 25
Beef, mess, city packed ..... do.....	14 50 to 15 00	14 00 to 14 75
Lard ..... per pound..	09 to 09½	09 to 09½
Cotton, middling ..... do.....	23⅜ to 24¼	25½ to 26½
BALTIMORE.		
Flour, superfine ..... per barrel..	7 00 to 8 75	7 50 to 9 25
extra ..... do.....	8 00 to 9 00	8 50 to 9 50
family and fancy ..... do.....	12 50 to ———	13 50 to ———
Wheat, Pennsylvania ..... per bushel..	1 98 to 2 00	2 10 to ———
western ..... do.....	2 00 to 2 05	2 10 to ———
Maryland ..... do.....	.....	2 05 to 2 25
Rye ..... do.....	1 00 to 1 05	95 to 1 05
Corn, yellow ..... do.....	69 to 70	73 to 75
white ..... do.....	72 to 73	77 to 78
Hay, western ..... per ton...	35 00 to ———	34 00 to 35 00
Pennsylvania and Maryland .... do.....	35 00 to ———	35 00 to 40 00
Pork, mess ..... per barrel..	14 00 to 14 25	13 75 to 14 00
Butter, western, prime to choice .. per pound..	23 to 30	22 to 27
New York ..... do.....	30 to 35	.....
Cheese, western factory ..... do.....	15 to 16	13 to 14½
eastern factory ..... do.....	18 to 18½	.....

Market prices of farm products—Continued.

Articles.	May.	June.
BALTIMORE—Continued.		
Lard ..... per pound..	$0 08¾ to $0 09½	$0 08¾ to $0 09½
Cotton, ordinary ..... do.....	20½ to ———	19½ to ———
middling ..... do.....	23⅛ to ———	24¾ to ———
Tobacco, common to good lugs ..... per cwt..	7 00 to 8 50	6 50 to 8 00
common to medium leaf .... do.....	7 50 to 9 00	7 00 to 9 50
Wool, unwashed, free from burrs.. per pound..	47 to 50	45 to 46
tub-washed ..... do.....	80 to 83	70 to 75
CINCINNATI.		
Flour, superfine ..... per barrel..	6 75 to 7 25	6 65 to 7 25
extra ..... do.....	7 15 to 8 35	8 35 to 8 50
family ..... do.....	8 35 to 8 50	8 50 to 8 75
Wheat, No. 1 white ..... per bushel..	2 00 to 2 05	2 00 to 2 05
No. 2 white ..... do.....	———	———
No. 1 red ..... do.....	1 88 to ———	1 90 to ———
No. 2 red ..... do.....	1 85 to ———	1 85 to 1 87
Corn, white ..... do.....	50 to 51	53 to 54
yellow ..... do.....	———	———
Oats, white ..... do.....	45 to ———	45 to 46
No. 1, mixed ..... do.....	43 to ———	43 to ———
Rye ..... do.....	92 to 94	90 to 93
Barley, winter, No. 2 ..... do.....	65 to 75	70 to 75
spring, No. 2 ..... do.....	65 to 75	60 to 65
Hay, com. to choice ..... per ton...	18 00 to 25 00	20 00 to 25 00
from store ..... do.....	22 00 to 30 00	21 00 to 27 00
Pork, mess ..... per barrel..	13 00 to 14 00	12 00 to 15 00
prime ..... do.....	———	———
Beef, plate ..... do.....	12 75 to 13 60	12 25 to ———
hams ..... do.....	26 00 to 28 00	13 00 to 13 50
Lard, prime, steam ..... per pound..	8⅛ to 11½	8¼ to 11¾
Butter, Western Reserve ..... do.....	28 to 30	20 to 22
choice Central Ohio ..... do.....	22 to 28	17 to 20
Tobacco, lugs ..... do.....	8 to 18	8 to 18
leaf ..... do.....	9 to 25	9 to 25
Wool, tub-washed ..... do.....	70 to ———	65 to 68
fleece-washed, manufacturing.. do.....	60 to ———	60 to 65
fleece-washed, combing ..... do.....	60 to 70	65 to 70
unwashed, manufacturing ..... do.....	45 to 48	40 to 45
unwashed, combing ..... do.....	50 to 55	50 to 55
pulled ..... do.....	65 to 68	60 to 65
CHICAGO.		
Flour, winter, extra ..... per barrel..	10 00 to 10 50	10 50 to ———
spring, extra ..... do.....	7 00 to 8 75	7 00 to 8 25
Wheat, No. 1 spring ..... per bushel..	———	1 51 to ———
No. 2 spring ..... do.....	1 51 to 1 52½	1 43 to 1 46
No. 3 spring ..... do.....	———	1 38 to 1 39
Corn, No. 2 ..... do.....	47⅝ to 48⅜	42½ to 43¾
rejected ..... do.....	45 to 45½	40 to 41
Oats, No. 2 ..... do.....	41½ to 43	42 to 43½
rejected ..... do.....	———	34 to ———
Rye, No. 2 ..... do.....	85 to ———	75 to 76
Barley, No. 2 ..... do.....	60 to 64	56 to 60
Hay, timothy, (on track) ..... per ton..	16 00 to 19 00	19 50 to 22 00
prairie ..... do.....	10 00 to 12 00	11 00 to 13 00
Pork, mess ..... per barrel..	12 60 to 12 70	11 95 to 12 00
extra ..... do.....	———	———
Beef, mess ..... do.....	9 00 to 10 00	9 00 to 10 00
Lard ..... per pound..	8¼ to 8⅞	8¼ to 8½

Market prices of farm products—Continued.

Articles.	May.	June.
CHICAGO—Continued.		
Butter, choice dairy ..... per pound..	$0 25 to $0 27	$0 18 to $0 20
fair to choice tub and firkin ..do.....	16 to 21	14 to 18
Cheese, New York factory ..... do.....	15 to 16	14 to 15
western factory ..... do.....	12 to 14	12 to 14
Ohio factory ..... do.....	13 to 14	12 to 14
Wool, medium fleece ..... do.....	63 to 68	63 to 68
unwashed, medium ..... do.....	40 to 50	46 to 50
tub-washed ..... do.....	62 to 80	62 to 80
SAINT LOUIS.		
Flour, superfine ..... per barrel..	5 50 to 5 75	5 00 to 6 50
extra ..... do.....	6 00 to 8 75	7 00 to 8 50
choice ..... do.....	9 25 to 10 25	9 50 to 10 15
Wheat, red ..... per bushel..	1 85 to 2 14	1 70 to 2 05
white ..... do.....	2 00 to 2 50	1 77½ to 2 15
spring ..... do.....	5 50 to ———	1 40 to 1 45
Corn, mixed ..... do.....	45 to 56½	44 to 59
yellow ..... do.....	45 to 56	47 to 55
white ..... do.....	49 to 60	56 to 62
Oats, white ..... do.....	48 to 51	——— to ———
mixed ..... do.....	48 to 51	39 to 41
Rye ..... do.....	80 to 83	70 to 71
Barley, winter ..... do.....	80 to 82½	70 to ———
spring ..... do.....	41 to 75	——— to ———
Hay ..... per ton..	21 00 to 25 00	18 00 to 23 50
Pork, mess ..... per barrel..	12 75 to 13 00	12 00 to 12 50
Lard, prime steam ..... per pound..	9 to 10	9¼ to 10¼
kettle ..... do.....		
Butter, choice ..... do.....	25 to 27	18 to 20
medium to fair ..... do.....	18 to 23	16 to 17
Cheese, choice factory ..... do.....	17 to 19	13 to 13½
Cotton, middling ..... do.....	22½ to ———	25 to 25⅝
Tobacco, lug ..... per cwt..	6 80 to 8 00	7 50 to 8 50
common leaf ..... do.....	8 00 to 8 75	8 00 to 8 75
medium to good leaf ..... do.....	9 00 to 11 00	9 00 to 11 00
Wool, tub-washed ..... per pound..	63 to 77½	65 to 71½
fleece-washed ..... do.....	50 to 60	54 to 56
unwashed medium ..... do.....	43 to 45	45 to 48
NEW ORLEANS.		
Flour, superfine ..... per barrel..	6 25 to ———	6 62½ to ———
extras, (according to grade) .... do.....	6 50 to 12 00	7 00 to 12 00
Corn, white ..... per bushel..	72 to 73	72 to 75
yellow ..... do.....	70 to 72	74 to 75
mixed ..... do.....	70 to 71	72 to 73
Oats ..... do.....	64 to 65	53 to 56
Hay, choice ..... per ton..	35 00 to ———	34 00 to 35 00
prime ..... do.....	35 00 to ———	34 00 to 35 00
Pork, mess ..... per barrel..	13 50 to 14 00	13 12½ to 13 50
Beef, mess, (Texas) ..... do.....	11 00 to 12 00	11 00 to 12 00
Lard, tierce ..... per pound..	9⅝ to 10	9 to 9⅝
keg ..... do.....	10½ to 11	10⅝ to 11¼
Butter, choice western ..... do.....	28 to 30	25 to 28
Goshen ..... do	40 to ———	38 to 40
Cheese, choice factory ..... do.....	——— to ———	12 to 14
western reserve ..... do.....	17 to ———	——— to ———
New York cream ..... do.....	22 to ———	——— to ———
Cotton, ordinary to middling ..... do.....	19½ to 23½	19½ to 24

Market prices of farm products—Continued.

Articles.	May.	June.
NEW ORLEANS—Continued.		
Cotton, middling to good middling.....per pound..	$0 23 to $0 23¾	$0 24⅛ to $0 24¼
Tobacco, lugs.....do.....	8 to 9	8 to 9
low-leaf.....do.....	9 to 10	9 to 10
medium.....do.....	10 to 10½	10 to 11½
SAN FRANCISCO.		
Flour, superfine.....per barrel..	4 50 to 5 00	4 75 to 5 00
extra superfine.....do.....	5 50 to 5 75	5 00 to 6 00
higher grades.....do.....	6 10 to 6 25	6 25 to 6 50
Wheat, State.....per cental..	1 85 to 2 05	1 85 to 2 15
Oregon.....do.....	1 85 to 2 05	1 85 to 2 15
Corn, white.....do.....	1 75 to 1 85	1 65 to ———
yellow.....do.....	1 50 to 1 55	1 55 to ———
Hay, State.....per ton..	10 00 to 20 00	16 00 to 23 00
Pork, mess.....per barrel..	17 00 to 22 00	17 00 to 22 00
prime.....do.....	16 00 to 17 50	16 00 to ———
Beef, mess.....do.....	12 00 to 22 00	12 00 to 22 00
Lard.....per pound..	11½ to 13¾	10 to 13
Butter, overland.....do.....	15 to 20	15 to 20
California.....do.....	20 to 25	25 to 30
Oregon.....do.....	10 to 15	10 to 15
Cheese.....do.....	13 to 17	14 to 22½
Wool, native.....do.....	35 to 40	35 to 40
California.....do.....	45 to 55	45 to 50
Oregon.....do.....	40 to 50	40 to 50